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# FLORA INDICA.

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# FLORA INDICA;

OR,

## DESCRIPTIONS OF INDIAN PLANTS.

BY THE LATE

WILLIAM ROXBURGH, M.D. F.R.S.E.

ETC. ETC.

88520

VOL. III.

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# PREFACE TO THE THIRD VOLUME.

In consequence of what has been mentioned in the Advertisement prefixed to the First Volume of this work, as well as in an Article in the Journal of the Asiatic Society for April 1832, entitled "Review of Indian Botany," page 138, the inference will probably be drawn that the Public have much to regret, in its being presented to the world without Dr. Wallich's additions. To deny this is not the intention of the writer of this Preface, but to offer some further explanation of the reasons which led to it. In the latter end of 1830, when the Publishers determined, with the assistance of the Author's greatly esteemed friend, the Reverend Dr. Carey, to complete the Publication of the "FLORA INDICA," upwards of ten years had elapsed since the First Volume of the old Edition had appeared, during which interval one other Volume only was added to it. At this period (the conclusion of 1830) Dr. Wallich was in England, and the Publishers had no means of judging when he purposed returning to India, or whether he intended to remain altogether in Europe. Calls for the completion of the Work had from time to time been made in the Journals and Periodicals of the day, and the obligation they were under not to allow a Work, the result of much study and labour, to remain longer dormant, had continued undischarged too long. Further delay was out of the question. Two modes of Publication now suggested themselves;—one, to complete the remaining Volumes, making use of Dr. Wallich's manuscript Notes and Additions; the other, to publish them without. Both were set aside: the first was palpably improper, circumstances not admitting of Dr. Wallich's acquiescence being previously sought: the second would have given to the world a confused and mutilated work. In lieu it was determined, although entailing much additional expence, to REPRINT the two

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Volumes published in 1820 and 1824, leaving out Dr. Wallich's Notes and Additions, and then to complete the work as originally left in Manuscript by the Author. These then are briefly the reasons which induced the Publication of the "FLORA" in its present shape; whether the public will have really cause to be dissatisfied, is not for an individual to decide. The undersigned would merely remark, that had the "FLORA INDICA" been published with Dr. Wallich's Additions, the quantity of matter would undoubtedly have been greatly increased, and so would the price of the Work. It now comprises in three Volumes the greater part of the productions of Hindoostan, Bengal and the Dukshin, including the Coasts, while with Dr. Wallich's additions it would have also embraced those of Nepal and Ava, and some subsequent discoveries in Bengal and Hindoostan. The bulk and price of the work in the latter case, would have probably been just double what it at present is;—the Public will best decide upon the merits of the two plans.

The friends of Dr. Wallich, among whom the writer of this Preface would include himself, will not, it is presumed, be disposed to lay much stress upon the circumstance of his labours having been unavailable in the present instance, as they are doubtless sensible that his extensive Researches in the Territories of Ava and Nepal, are of themselves capable of furnishing ample materials for a separate Publication. The undersigned desires in conclusion to take this opportunity to convey to the Reverend Dr. Carey, the grateful sense entertained by his brother Captain Bruce Roxburgh (who has recently embarked for Europe) and himself, of the ready kindness with which the editing of the "FLORA INDICA" was undertaken, without which proof of his continued attachment to the memory of the Author, the result of his many years study and labour must have longer remained in oblivion.

JAMES ROXBURGH.

AGRA,
*7th Sept.* 1832.

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# FLORA INDICA.

## CLASS XIV.

### DIDYNAMIA GYMNOSPERMIA.

*AJUGA. Schreb. gen. N.* 959.

*Calyx* five-toothed. *Upper lip* of the corol small, bidentate, and shorter than the stamina.

1. A. *fruticosa. Roxb.*

Shrubby, erect, ramous, downy. *Leaves* broad-lanceolate, serrate; the superior pair of anthers simple, the lower pair twin.

*Nepeta malabarica. Linn. sp. pl. ed. Willd.* 357.

*Tam.* Retti pemeretti.

A native of the coast of Coromandel, where it is esteemed a medicine of considerable virtue by the inhabitants.

*Stem* erect, shrubby. *Bark* ash-coloured. *Branches* with four rounded angles, and furrowed sides, all the young tender parts covered with much, very soft, white down; height of the shrubs from four to six feet. *Leaves* opposite, short-petioled, drooping, cordate-lanceolate, or broad-lanceolate, serrate, and clothed like the young branches with much soft, white down, from one to six inches long, and about one-fourth of that in breadth. *Flowers* numerous, large, purple, sessile, alternate, or opposite, decussate, dichotomous, downy, ra-



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mous spikelets, which terminate the branches. *Bractes* filiform, and like every other part of the plant, downy. *Calyx* somewhat gibbous, mouth five-cleft, downy; *corol, upper lip* erect, entire, shorter than the stamina; the *lower* one three-lobed, with the middle tube cordate, emarginate, of a lively purple colour, and much larger than the paler coloured, posterior, or lateral lobes. *Filaments* nearly equal, and adhering to each other. *Anthers* on the short, or exterior pair of filaments, twin, on the long or inner pair, single.

2. *A. disticha. Roxb.*

Annual, ramous. *Leaves* cordate, serrate, downy. *Spikes* axillary, two-cleft, recurvate, secund. *Bractes* subulate. *Lower anthers* twin.

Ballota disticha. *Linn. sp. pl. ed. Willd.* iii. 108. and probably *Nepeta indica* of the same, iii. 57.

*Beng.* Gobura.

Tsjadaen. *Rheed. Mal.* x. *t.* 88.

This is one of our largest annuals; it grows in hedges, &c. where the soil is good and dry. Flowers during the wet and cold seasons.

*Stems* erect, four-sided, with a few pairs of opposite branches, downy, from three to six feet high. *Leaves* opposite, petioled, cordate, obtusely serrate, very soft, downy, three inches long, and two broad. *Flowers* seemingly verticelled, but are arranged alternately; *ovula* recurved; *spikes* sessile in the opposite axills; there is always a single flower stands between the pair of spikes. *Bractes* subulate, hairy, two to each flower. *Calyx* gibbous, five-toothed, (never ten-striated). *Corol; tube* length of the calyx; *upper lip* green, short, entire, projecting; *under lip* many times larger, recurved, about the middle it is enlarged with two wings, beyond which it expands into two, large, deep purple, orbicular, crenulate, depending segments. *Stamina* the short pair twin. *Anthers*, the larger single.

*Obs.* The family character does not well accord with that

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of *Ballota*, nor of *Nepeta*; I have therefore removed it to *Ajuga*.

3. A. *repens. R.*

Biennial, procumbent, hairy. *Leaves* from oblong to lanceolar, tapering down the petioles, grossly and unequally serrate; *spikes* terminal, cylindric. *Bractes* oblong, ventricose, five-flowered, or ten to the verticel.

A native of Chittagong. Flowers in December and January, and the seed ripens in February and March.

Is rather a robust species, spreading over a space of about two feet in diameter; the lower branches generally emit root from the joints, which rest on the ground.

*TEUCRIUM. Schreb. gen. N.* 960.

*Calyx* five-parted. *Corol* with the *upper lip* two-parted beyond the base, where the stamina are.

T. *stoloniferum. Roxb.*

*Root* perennial, stoloniferous. *Stems* straight, four-sided. *Leaves* cordate, serrate, rugose. *Panicles* terminal.

A native of the eastern parts of Bengal. Flowering time the rainy season.

*Root* perennial, producing numerous runners, which spread wide, and propagate fast. *Stems* annual, erect, four-sided, villous, simple till near the top of the plant, where there are a few pairs of opposite branchlets; the whole plant about two feet high. *Leaves* opposite, petioled, drooping, cordate, serrate, a little wrinkled, soft, and a little villous. *Petioles* shorter than the leaves, channelled. *Panicles* terminal, which includes the whole of the top of the plant. *Bractes* opposite, elliptic, villous, one-flowered. *Flowers* numerous, small, of a lively pink.



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*ELSHOTZIA. Willd.*

*Calyx* tubular, five-toothed. *Corol* bilabiate; the *upper lip* three- (four- Willd.) parted, the *under lip* undivided. *Stamina* distant.

E. *villosa. R.*

Shrubby, downy. *Leaves* ovate, lanceolate, serrate; *spikes* panicled, sub-secund.

Rujat the vernacular name in Silhet, where it is indigenous, and is used in complaints of the bowels by the natives. Flowering time the rainy season.

*MENTHA. Schreb. gen. N.* 967.

*Calyx* five-toothed. *Corol* nearly equal, four-cleft. *Stamina* erect, distant.

1. M. *paniculata. R.*

Annual, erect; *branches* brachiate. *Leaves* long-petioled, triangularly cordate, grossly serrate. *Spikes* cylindric, panicled.

A native of the hills of Chittagong, where it blossoms during the cool season. The natives use the leaves in their curries on account of their grateful smell and taste.

2. M. *auricularia. Willd.* iii. 74.

*Spikes* terminal, cylindric, mixed with ciliate bractes. *Leaves* sub-sessile, oblong, serrate, hairy. *Stamina* longer than the corol.

Majana foetidia. *Rumph. Amb.* vi. *t.* 16. *f.* 2. bad.

A native of the Moluccas, and rather a weak, flaccid, ramous, four-sided, hairy plant.

3. M. *quadrifolia. Roxb.*

Perennial, erect, stems round. *Leaves* four-fold, nearly li-

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near, serrate; *spikes* terminal, cylindric. *Filaments* hairy, and longer than the corol.

*Teling.* Konda-jajain.

This seems an undescribed species, it is perennial, a native of the tops of hills, and the middle region of the Circar mountains, growing amongst the rocks. It flowers during the rainy season.

*Stems* many, erect, with few branches, woody, round, from two to four feet high. *Leaves* four-fold, rarely three-fold, spreading, short-petioled, linear-lanceolate, serrate, rugose, downy, from two to three inches long, and about half an inch broad. *Spikes* terminal, solitary, cylindric, crowded with innumerable, small, rose-coloured flowers. *Corol; tube* twice the length of the calyx, segments reflexed. *Filaments* much longer than the corol, sub-equal, very hairy.

This plant is very fragrant, not less so than our garden mint in Europe; common garden soil is too moist and too rich for it, for there it has always soon perished with me.

4. M. *verticillata. R.*

Annual, erect. *Leaves* verticelled, sessile, linear-lanceolate, serrate. *Spikes* terminal, cylindric.

*Beng.* Panee-kula.

Found in wet places near Calcutta, appears and flowers during the rains.

*Stems* annual, erect. *Branches* a few near the top, and verticelled. *Leaves* verticelled, sessile, linear, serrate. *Spikes* solitary, terminal, cylindrical. *Filaments* woolly, twice the length of the corol.

The plant has a considerable share of aromatic smell, and taste.

5. M. *stellata. Buch.*

*Spikes* terminal, cylindric. *Leaves* filiform, minute, verticelled.

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6. M. *fruticosa. Roxl.*

Shrubby. *Leaves* ovate-lanceolate, serrate, downy. *Panicles* brachiate, terminal. *Filaments* and *style* much longer than the corol, and variously bent.

A native of the Circar mountains.

Shrubby. *Leaves* from cordate to oval, serrate. *Spikes* terminal, secund, flowers fascicled. *Stamens* hairy, double the length of the corol.

*Beng.* Jul-luta.

Elsholtzia. *Banksian herbarium.*

This plant is common, and indigenous all over Bengal; flowering time the end of the cold season.

*Stems* many, shrubby, erect, ramous, round, smooth, coloured. *Leaves* opposite, petioled, oval and cordate, grossly serrate, when young downy, with the veins and nerves coloured, from four to six inches long. *Petioles* roundish, slightly channelled, much shorter than the leaves. *Spikelets* terminal, and from the exterior axills, secund, very numerous, the whole of each branch forming a long panicle. *Bractes* numerous, hairy, and ciliate, the exterior one of every other pair is generally abortive; in the axill of each of the other three fertile ones is a fascicle or two, of from four to twelve smaller falcate bractes, embracing like an involucre, about as many flowers. *Calyx* sub-cylindric. *Corol; upper lip* broad, three-parted, erect; *under lip* entire, ovate, pointed. *Filaments* double the length of the corol, hairy. *Style* the length of the stamina. *Stigma* two-cleft, segments tapering and expanding.

The plant possesses a strong, heavy, aromatic smell and bitterish taste.

7. M. *sativa. Willd.* iii. 79.

*Flowers* verticelled. *Leaves* elliptic, serrate. *Stamina* longer than the corol.

*Beng.* Poodena, Pudun, &c.

Found common in gardens throughout India.

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8. M. *perilloides. Linn. sp. pl. ed. Willd.* iii. 83.

Annual, hairy. *Leaves* cordate, grossly serrate. *Racemes* terminal, and axillary, sessile, four-sided. *Flowers* in opposite approximate pairs, sub-secund. *Bractes* as long as the flowers. *Stamens* shorter than the corol.

Perilla ocymoides. *Linn. sp. pl. ed. Willd.* iii. 83.

A native of Nepal, from thence Dr. Buchanan sent the seeds to this garden, where, in one year from the time the seed was sown the plant blossomed abundantly.

*Stem* erect, with four rounded angles, and excavated sides, hairy. *Branches* opposite, expanding, and, like the stem of the most luxuriant plants, about three feet high. *Leaves* opposite, long-petioled, broad, cordate, grossly-serrate, hairy on both sides, from three to five inches long, and from two to four broad. *Petioles* hairy, channelled. *Racemes* axillary and terminal, sessile, four-sided, particularly before the flowers expand. *Bractes* lanceolate, acute, one-flowered. *Flowers* in opposite, decussate, approximate pairs, tending to point to one side only. *Calyx* hairy; divisions five, nearly equal. *Corol*, the *upper* segment emarginate; the *under* one much broader and longer, sub-reniform. *Stamens* rather shorter than the corol. *Anthers* of two distinct lobes.

*GLECHOMA. Schreb. gen. N.* 970.

*Calyx* five-cleft, each pair of anthers converging in form of a cross.

G. *erecta. Buch.*

Annual, erect. *Leaves* cordate. *Peduncles* axillary, bearing several flowers in a head.

A native of the skirts of the mountains of Nepal where it is called *Niasbo* by the natives, and used internally as a remedy in Gonorrhea. From thence the seeds were sent by Dr. Buchanan, under the above name, to the Botanic garden where the plants thrive well, blossom and ripen their seed all the year round.

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*Root* annual. *Stems* nearly erect, four-sided, villous, branchy near the base, from one to two feet high. *Leaves* opposite, petioled, cordate, serrate, downy. *Peduncles* axillary, solitary, round, longer than the petioles, supporting a dichotomous head of many small purple flowers, at and near the apex they become more and more approximate, and the leaves smaller and smaller, and may then be called exterior bractes. *Bractes* numerous, lanceolate, ciliate. *Calyx* ventricose, ten-ribbed, five-toothed, villous. *Anthers* twin. *Seeds* very small.

The plant possesses a pleasant smell, not unlike that of balm, and has a pungent bitterish taste.

*LEONURUS. Schreb. gen. N.* 977.

*Anthers* sprinkled with glossy dots.

L. *Tataricus. Willd.* iii. 116.

Annual, erect, four-sided. *Leaves* from bipinnatifid to simple. *Calyces* with divisions daggered. *Involucres* bristly, upper lip of the corol vaulted.

*Cardiaca* foliis tenuis, &c. *Mill. fig. A.* 80.

Its native place uncertain, though common in gardens all over India. It is a plant of short duration, not more than three or four months, but there is a constant succession of them all the year round.

*PHLOMIS. Schreb. gen. N.* 978.

*Calyx* angular, toothed; *upper lip* of the ringent corol vaulted, incumbent, villous.

1. P. *repetifolia. Willd.* iii. 126.

Annual, straight. *Leaves* long-petioled, cordate, serrate, downy. *Calyx* eight-spinous-toothed, the upper and lower larger.

*Hind.* Hejur-chei.

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Is a native of hedges, old mud walls, &c. It is a very specious-looking plant; flowering in the cold season.

*Stem* annual, straight, four-sided, simple, from four to six feet high. *Leaves* opposite, spreading, petioled, cordate, serrate, pointed, downy, from four to eight inches long, and two or three broad. *Floral leaves (bractes verticillorum,)* lanceolate, depending. *Petioles* channelled, winged with the decurrent leaf; *verticels* globular, two, three or four, towards the apex of the plant, about five inches asunder. *Involucres* many, subulate. *Flowers* numerous, of a deep rich orange colour. *Calyx* ten-striated, eight-toothed, of which the six lateral ones are smoothest, all very sharp. *Corol; under lip* very short, three-toothed, at all times of a dirty withered colour. Cattle do not eat of it, nor is it put to any use that I know of.

2. P. *zeylanica. Willd.* iii. 123.

Annual, straggling. *Leaves* linear-lanceolate, somewhat serrate. *Calyx* obliquely and slightly eight-toothed. *Verticel* axillary.

Herba admirationis. *Rumph. Amb.* vi. *t.* 66. *f.* 1.

Tumba. *Rheed. Mal.* x. *t.* 91.

*Hind.* and *Beng.* Hull-khusa.

*Teling.* Poo-alla-tumi.

This is one of the most common plants, every soil seems to suit it; but it delights most in rubbish.

*Stem* annual, when old straggling, four-sided, angles rounded, about two feet high; *branches* opposite. *Leaves* remote, short-petioled, narrow-lanceolate, remotely and slightly serrate, a little downy, from two to three inches long and about one quarter of an inch broad. *Verticels* two or three towards the apex, small, globular. *Involucres* subulate. *Calyx* ten-striated, curved, widening; *mouth* oblique, slightly eight-toothed. *Flowers* white; *upper lip* short, projecting, hairy, vaulted; the *under lip* large, three-parted; middle divisions broad, truncated. *Anthers* two-lobed, one over the other.



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This plant has a pleasant faint aromatic smell, its flowers are used by the brahmins to decorate their idols. In the Banksian herbarium, two other specific names are attached to it, viz. *obliqua* and *malabarica*.

3. P. *esculenta. Roxb.*

Annual, erect, ramous. *Leaves* lanceolar, serrate, downy; *heads* generally terminal or with one globular verticel at the next pair of the leaves. *Calyx* obliquely ten-toothed.

*Hind.* and *Beng.* Choota-hull-koossa.

*Teling.* Manchy-tumi, or tumi-kura.

This species is annual, it grows common on dry cultivated lands. Flowers during the wet season.

*Stem* annual, erect, ramous, four-angled, four-grooved, downy, from one to two feet high. *Leaves* opposite, short-petioled, broad-lanceolate, serrate, downy, about two inches long and three quarters of an inch broad. *Verticels* one or two, many-flowered. *Involucres* very numerous, subulate, ciliate. *Calyx* obliquely ten-toothed.

The plant possesses a considerable degree of a peculiar fragrance; its leaves are used as a potherb by the natives.

4. P. *cephalotes. Kön. Mss.*

Annual, erect, ramous. *Leaves* ovate-lanceolate, acute, serrate, downy. *Heads* terminal. *Involucres* lanceolate, ciliate. *Calyx* with the mouth even, and cut into ten equal divisions.

*Hind.* and *Beng.* Bura-hul-khusa.

*Teling.* Gurosa-tumi.

Like the former (P. *esculenta*,) but in other respects they are dissimilar. *Leaves* opposite, short-petioled, oblong, pointed, serrate, soft, downy, about two inches long, and less than one broad. *Verticels* generally solitary, terminal, globular, many-flowered. *Flowers* numerous, white. *Involucres* numerous, imbricate, lanceolate, incurved, ciliate. *Calyx* erect, gibbous, ten-striated; *mouth* horizontal, ten-toothed. *Corol*

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*upper lip* erect, vaulted, very hairy; *under lip* as in the rest. *Anthers* oval (not two-lobed.)

It differs from P. *zeylanica*, and *esculenta*, in the form of the involucres, calyx, and anthers, as well as in the general habit of the plants. No use is made of this species.

5. *P. calycina. Roxb.*

Diffuse, villous. *Leaves* long-ovate, grossly and bluntly serrate, smooth. *Peduncles* few-flowered. *Calycine segments* five, cuneate, as long as their tube.

A native of the northern parts of Hindoostan.

6. P. *urticifolia. Willd.* iii. 124.

Annual, erect, four-sided, villous. *Leaves* ovate, bluntly serrate, smooth; *verticels* several, globular, many-flowered. *Involucres* pedicelled, linear-lanceolate, ciliate, mucronate. *Calyx* obliquely ten-mucronate-toothed.

A native of Coromandel, and also found wild in Hindoostan by Col. Hardwicke.

7. P. *moluccana. Roxb.*

Annual, erect, ramous, villous. *Leaves* petioled, from oval to rhomboidal, crenate. *Flowers* in axillary fascicles. *Involucre* minute. *Calyx* even, ten-ribbed, ten-toothed, alternately smaller.

A native of the Moluccas.

8. P. *montana. Kön. Mss.*

Perennial, ramous, downy. *Leaves* short-petioled, ovate-cordate, serrate. *Verticels* few-flowered, mouth of the calyx even, and cut into ten equally sharp-toothed segments.

Compare with P. *chinensis. Willd.* iii. 125.

Is a native of hills, and dry barren spots, &c.

*Stem* short, perennial; *branches* ascending, four-sided, downy, from one to two feet high. *Leaves* opposite, short-petioled, ovate-cordate, crenulate, downy, about an inch long, and three



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quarters of an inch broad. *Verticels* numerous, from six to twelve flowered. *Involucres* few, linear, erect, many times shorter than the calyx. *Flowers* white. *Calyx* straight, widening, ten striated, ten-toothed. *Corol; upper lip* erect, vaulted, hairy; *under lip* horizontal, broad, three-lobed; middle lobe slightly four-parted.

9. P. *biflora. Willd.* iii. 124.

Creeping, four sided. *Leaves* petioled, ovate-oblong, serrate, smooth. *Flowers* in axillary pairs; *calyx* toothed, alternately smaller.

Leucas foliis rotundis, serratis, flore albo, *Burm. Zeyl.* 140. *t.* 63. *f.* 1. agrees pretty well with this plant.

It is common about Calcutta; and in flower most part of the year.

*Stems* or *branches* perennial, numerous, creeping; when young four-sided, almost smooth. *Leaves* opposite, petioled, erect, ovate-oblong, posterior sides entire, interior grossly ovate, smooth. *Flowers* generally solitary, though sometimes in pairs, axillary, peduncled, white. *Involucres* few, very small, subulate. *Calyx* funnel-shaped, ten-striated, ten toothed, teeth alternately smaller. *Corol*, of two lips nearly equal in length; the *upper* one erect, vaulted, and very hairy; the *under* one very broad, and three-parted.

10. P. *pilosa. Roxb.*

Perennial, erect, hairy. *Leaves* cordate, serrate, soft and hairy. *Flowers* axillary, sub-solitary, sessile, naked. *Calyx* with an even, ten-toothed mouth.

A native of Bengal, where it flowers during the rains.

*Root* perennial. *Stem* and *branches* erect, four-sided, soft and hairy. *Leaves* opposite, short-petioled, oblong cordate, serrate, hairy and very soft, about two inches long, by one or one and a half broad. *Flowers* axillary, generally solitary, naked; sub-sessile, white. *Calyx* ten-striated; *mouth*

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even, hairy; *upper lip* vaulted, and very hairy; the *under* one of three, broad, villous segments.

*CLINOPODIUM. Schreb. gen. N.* 930.

*Involucre* many leaved under the verticel. *Calyx* bilabiate. *Corol*, with *upper lip* plain, obcordate, and straight.

C. *repens. R.*

*Root* annual. *Stems* and *branches* four-sided, creeping, clothed with recurved hairs. *Leaves* short-petioled, ovate, crenate-serrate. *Verticels* numerous. *Bractes* subulate, very hairy.

A native of Nepal, from thence Dr. Buchanan sent the seeds to the Botanic garden at Calcutta in November 1802, where the plants blossom during the rains.

*Root* generally annual, fibrous. *Stems* and *branches*, while the plants are young, nearly erect, but with the branches soon becoming procumbent, and lastly creeping; all are four sided, and clothed with many, white, recurved hairs. *Leaves* opposite, from one to two inches asunder, short-petioled, ovate, cordate, with the interior margins crenate, serrate, hairy, and wrinkled, about one inch long, and three quarters of an inch broad. *Verticels* numerous, from ten to fifteen-flowered. *Flowers* small, rose-coloured. *Involucres* subulate, and ciliate with numerous, long distinct hairs. *Calyx* striated, hairy.

*OCYMUM. Schreb. gen. N.* 986.

*Calyx* with the upper lip circular, lower one four-parted. *Corol* resupinate, with the superior lip four-cleft; the other undivided. *Exterior filaments* (in some of the species) crested near the base.

1. O. *villosum. R.*

Shrubby. *Branches* round, villous. *Leaves* ovate, oblong,

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obtuse, serrate, downy. *Bractes* petioled, reniform, cordate, acuminate.

*Urjuka*, its Sanscrit name. See *Asiat. Res.* iv. 288. 9.

*Hind* and *Beng.* Toolasi, or Toolsi.

Soladi-tirtava. *Rheed. Mal.* x. *t.* 87.

This charming species is common in gardens and about the temples of the Hindoos over every part of India; it is in blossom most part of the year.

*Stem* erect, short, woody, round. *Bark* with a thin, light-brown, scaly epidermis. *Branches* numerous, the tender shoots clothed with much soft white hair. General height of the whole plant from two to three feet. *Leaves* opposite, petioled, ovate, oblong, crenate serrate, obtuse, downy, from one to two inches long. *Petioles* half the length of the leaves, downy. *Racemes* terminal, solitary or triple. *Flowers* triple, and opposite, appearing verticelled, of a pale, greenish pink. *Bractes* opposite, petioled, reniform, cordate, acute.

2. O. *sanctum. Willd.* iii. 162.

Somewhat shrubby. *Branches* round, hairy. *Leaves* oval, serrate, downy. *Bractes* petioled, broad-cordate. *Filaments* crested.

Nalla-Tirtava. *Rheed. Mal.* x. *t.* 85.

Purnasa the Sanscrit name. See *Asiat. Res.* iv. *p.* 188.

*Beng.* and *Hind.* Kala, or Krishna Toolasi or Toolsi.

*Teling.* Krishna toolasi.

Is always found cultivated in the gardens belonging to the Hindoo temples, in flower all the year round.

*Stem* short, woody, perennial. *Branches* numerous, opposite, round, dark purple, hairy. *Leaves* opposite, petioled, oval, serrate, downy, dark-coloured, about an inch and a half long, and one inch broad. *Racemes* terminal, erect, dark purple, hairy, four-sided. *Bractes* opposite, petioled, cordate, reflexed, three-flowered, (*i. e. verticels* six-flowered.)

This is a very grateful smelling plant, the brahmins hold it sacred to their gods Krishnu and Vishnu.

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3. O. *album. Willd.* iii. 160.

Annual, erect, bushy. *Leaves* short-petioled, ovate, cordate, remotely serrulate. *Racemes* terminal, sessile. *Bractes* petioled, ovate-cordate, three-flowered. *Upper lip* of the calyx round-reniform. *Filaments* crested, as long as the subcampanulate corol.

4. O. *bullatum. Lamarck. Encyclop.* i. 384.

Found in gardens only, and as the natives have no vernacular name for it, I conclude it is not a native of the continent of India. The scent is very powerful, more so, I think than any other species I have met with.

5. O. *thyrsiflorum. Willd.* iii. *p.* 158.

Biennial, erect, ramous, smooth, four-sided, four-grooved. *Leaves* broad-lanceolate, scarcely serrulate. *Panicles* terminal. *Bractes* broad-lanceolate. *Filaments* rather longer than the corol, and crested.

To Dr. Rottler of Madras I am obliged for the seed of this species, which has been the means of introducing it into Bengal, where it was not known before. It is in flower, chiefly during the rainy and cool seasons, though more or less the whole year. *Seed* in perfection throughout the dry season. *Stem* erect, *branches* many, opposite, spreading, four-sided; sides deeply grooved, the whole plant about three feet high. *Leaves* petioled, opposite, broad-lanceolate, on the interior margins of the largest are two or three remote serratures, sharp-pointed. *Panicles*, a terminal, ovate, dense one to each branch, ramifications thereof decussate. *Flowers* large, pale pink, forming a pretty contrast with the ferruginous calyces and bractes. *Bractes* opposite, lanceolate, ciliate, three-flowered, of a deep ferruginous colour. *Calyx; upper lip* orbicular, and ciliate, and its upper surface of the same colour as the bractes; *under lip* four-cleft. *Corol; upper lip* broad, four-parted; the *under* one of the same

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length, linear-oblong, with a rounded crenate apex. *Filaments*, the superior short pair amply crested.

This is one of the most fragrant, and prettiest species of *Ocymum* we have in India.

6. O. *caryophyllatum. Roxb.*

Shrubby; *branches* polished. *Leaves* broad-lanceolar, serrulate, smooth. *Bractes* petioled, lanceolate.

*Hind.* and *Beng.* Goolal-toolasi.

Is found about the temples, and in the gardens of the Hindoos. Is in blossom most part of the year, but chiefly during the latter part of the rains, and the cold season.

*Stem* erect, somewhat woody. *Branches* opposite, nearly round, and polished; height of the whole plant, from two to six feet. *Leaves* opposite, petioled, broad-lanceolar, pointed, slightly serrate, smooth on both sides, about three inches long, of which the petiole occupies about one-fourth part. *Racemes* terminal, erect, rachis furrowed, villous. *Bractes* petioled, lanceolate, somewhat ciliate, coloured. *Flowers* with pretty long peduncles, pretty large, and white. *Calyx*, *upper lip* nearly round, and ciliate. *Corol* hairy on the outside; *upper lip* erect, four-parted; *under lip* oblong, and much longer than the upper. *Filaments* rather longer than calyx, larger pair jointed, and crested near the base.

7. O. *pilosum. Roxb.*

Shrubby; *branches* four-sided, and furrowed. *Leaves* ovate oblong, serrate. *Bractes* petioled, sub orbicular, hairy; *upper lip* of the calyx orbicular and hairy, with corol twice its length.

*Beng.* Babooi-toolsi.

A native of India.

*Stem* erect. *Branches* opposite, expanding, with four furrows on the sides; young parts hairy. *Leaves* opposite, petioled, ovate, and ovate-oblong, serrate, both sides smooth, with the margins slightly ciliate, about two inches long, in-

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cluding the petiole. *Racemes* terminal, erect, rigid, hairy, with the six-flowered verticels approximate. *Bractes* petioled, ciliate, sub-orbicular, with a sharp point. *Flower* very short-peduncled, pretty large, and white. *Calyx* hairy, *upper lip* orbicular. *Corol; upper lip* four-parted, hairy on the outside; *under lip* oblong, concave, with the margins waved. *Filaments* the large pair, with a large hairy process near the base.

The seeds steeped in water swell into a pleasant jelly, which is used medicinally by the natives.

8. O. *gratissimum. Willd.* iii. 110.

Shrubby; *branches* four-sided, smooth. *Leaves* oblong-ventricose, serrate, smooth. *Bractes* short-petioled, cordate-lanceolate.

*Hind.* Ram-tulasi.

The whole plant, I think diffuses a stronger degree of fragrance, than any other of the genus. It is only found in gardens, and about the temples of the natives.

*Stem* erect, woody, perennial. *Bark* ash-coloured. *Branches* opposite, erect, four-seeded, when young smooth, glossy and green; whole height of the plant from four to eight feet. *Leaves* opposite, long-petioled, drooping, oblong, ventricose, remotely serrate, pointed, smooth on both sides, often six inches long, including the petiole, which is about a third of the whole. *Racemes* terminal, pretty long, rigidly erect, with the verticels of six flowers pretty close. *Bractes* short-petioled, reflexed, cordate-lanceolate. *Calyx; upper lip* marked with three nerves. *Corol* short, scarcely larger than the calyx, of a pale yellow underneath, oblong, concave, and entire. *Filaments* longer than the corol, with a large tuft of dark yellow hairs on the joints of the large pair near the base.

9. O. *Basilicum. Willd.* iii. 161.

Annual, the whole plant somewhat ferruginous. *Leaves*



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ovate-oblong, grossly and acutely serrate, smooth. *Bractes* lanceolate, ciliate. *Upper lip* of the calyx broad-cordate. *Stamina* and *style* longer than the corol. *Filaments* amply crested.

A native of Persia, from thence sent to the Botanic garden at Calcutta, under the Persian names, *Deban shah*, and *Deban Macwassi*. It is very nearly allied to our Indian *Goolal tulasi*, and to *thyrsiflorum*. In Bengal it flowers during the rains and the cool season.

10. O. *polystachyon. Willd.* i. 365.

Annual. *Stem* and *branches* four-sided, with sharp angles. *Leaves* sub-cordate, serrate. *Spikes* terminal. *Bractes* petioled, round-cordate. *Stamens* the length of the corol, not crested.

*Teling.* Neeru, *i. e.* water tulasi.

Is a native of ditches, and wet places. It flowers during the rainy season.

*Stem* annual, erect, from three to four feet high, four-sided, with very sharp angles, which are armed with small, sharp, scabrous excrescences. *Branches* numerous, opposite, like the stem. *Leaves* opposite, spreading, petioled, cordate, pointed, serrate; about two inches long, and one and a half broad. *Petioles* four-sided. *Racemes* terminal, and axillary, erect; *verticels* approximate. *Bractes* petioled, cordate, pointed, three-flowered. *Corol* twice the length of the calyx, all the divisions of the border are of the same length; *under lip* concave. *Filaments* wanting the characteristic processes of hairs. Cattle eat it. It possesses little or no fragrance.

11. O. *tuberosum. Roxb.*

Herbaceous, four-sided, smooth. *Leaves* sessile, oblong, grossly serrate, smooth. *Bractes* oval. *Filaments* crestless.

Is a native of vallies among the Orissa mountains; the whole plant is about a foot high.

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*Root* perennial, the fibres end in pretty large tubers. *Stems* several, short, annual, four-sided, smooth. *Leaves* opposite, short-petioled, oblong, very grossly serrate, running down the petioles near the base; smooth, six inches long, and about two broad. *Racemes* terminal, solitary; *verticels* remote. *Bractes* oval, three-flowered. *Flowers* rose-coloured, large. *Filaments* wanting the characteristic processes, or crest.

12. O. *cristatum. B. H.* and *Kön. Mss.*

Annual, four-sided. *Leaves* oval, crenate, serrate, dotted. *Bractes* linear, inserted in glandular receptacles. *Stamens* twice the length of the corol, crested.

A native of dry, barren spots; such as old dry walls, &c. Flowering time the wet season; it is entirely destitute of smell.

*Stem* erect, annual, or biennial, short, four-sided, slightly hairy, branchy, from twelve to eighteen inches high, angles rounded, sides grooved. *Branches* opposite, like the stem. *Leaves* opposite, petioled, oval, crenate-serrate, both sides covered with innumerable, minute, glandular pits. *Racemes* terminal, verticelled. *Verticels* six-flowered, less than an inch asunder. *Bractes* opposite, linear, longer than the flowers, sometimes a little twisted, caducous, each having a large, round, permanent, concave gland, into which it was or is inserted. This is an excellent specific mark. *Flowers* of a pale rose-colour, projecting horizontally. *Stamens* equal, more than twice the length of the corol, projecting apices erect; processes large and hairy. *Anthers* incumbent, oval.

*Note.* The long, linear bractes, with their concave, glandular receptacles, and the long stamens, are excellent specific marks.

13. O. *inodorum. Kön. Mss.*

Bi-triennial, four-seeded. *Leaves* cordate, crenate-serrate, rugose. *Bractes* cordate, sessile. *Stamens* the length of the corol, crestless.

A small, bi- tri- or perennial species, from one to two feet



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high; grows about old walls, and under the shade of bushes, forests, &c. where the soil is dry. Flowering time in the wet and cold seasons.

*Stem* very trifling, erect, somewhat woody. *Branches* opposite, four-sided, pretty smooth; sides grooved; angles rounded. *Leaves* opposite; *petioles* cordate, a little rugose, crenate-serrate, from one to two inches long. *Racemes* terminal, verticelled; *verticels* six-flowered. *Bractes* broad-cordate, acute, reflexed. *Flowers* very minute, scarcely appearing without the calyx. *Stamens* toothless.

This species is void of fragrance.

*PLECTRANTHUS. Schreb. gen. N.* 987.

*Calyx* with upper divisions larger. *Corol* resupinate, gibbous, or spurred at the base. *Filaments* simple.

1. P. *secundus. Roxb.*

Annual, erect, ramous, four-sided. *Leaves* round-cordate, crenate-serrate, long-petioled. *Floral leaves* sub-sessile, *Racemes* terminal, sub-secund, with opposite, three-nerved, from one to three-flowered bractes. *Nectary* gibbous. *Under lip* of the corol entire.

*Ocimum molle. Willd.* iii. 166.

A native of Mysore, from thence the seeds were sent by Mr. Heyne, to the Botanic garden at Calcutta, where the plants thrive luxuriantly, and blossom about the close of the rainy season.

*Root* ramous, annual. *Stem* erect, four-sided, with rounded angles; villous. *Branches* opposite, ascending, and like the stem; whole height from two to three feet. *Leaves* opposite, those of the stem and branches, long-petioled, floral leaves short-petioled; all are round-cordate, somewhat rugose, subsessile, and tomentose, margins crenate-serrate, with generally a smaller serrature between the larger; the usual size from one to four inches each way. *Petioles* as long as the leaves,

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slightly channelled. *Racemes* terminal, one, two, three, or more together, sub-secund. *Rachis* four-sided, villous. *Bractes* opposite, sessile, from ovate-oblong to cordate, generally three-nerved. *Flowers* pedicelled, from one to three belonging to each bracte, pointing to the outside, small, pale yellow. *Calyx; upper lip* cordate; the *under* one deeply divided into four long, acute, ascending divisions. *Corol*, base of the tube gibbous; *upper lip* erect, four-parted; the *under* one entire, horizontal, boat-shaped; the margins generally shut over the round two-lobed anthers.

The smell of the fresh leaves is somewhat spicy, but with a degree of heaviness, that renders it rather unpleasant than otherwise.

2. P. *scutellarioides. Roxb.*

Perennial; the whole plant of a deep purplish colour. *Leaves* ovate-oblong, obtusely serrate. *Panicles* terminal, racemose, verticels of four ramous pedicels. *Nectary* gibbous.

Ocimum *scutellarioides. Willd.* iii. 166.

Majorana rubra. *Rumph. Amb.* v. *p.* 291. *t.* 101.

Ocimum *scutellarioides. Mant.* 84.

Introduced into the Botanic garden at Calcutta among plants from the Moluccas, in 1798. It is in blossom about the close of the rains, and more or less the whole year round.

*Stem* erect, somewhat woody. *Branches* deeply coloured and villous. The whole plant about three feet high. *Leaves* opposite, petioled, ovate-oblong, obtusely serrate, rugose, somewhat downy, and like the young shoots of a deep purplish green, particularly on the under side; from one to three inches long. *Racemes, (panicles)* terminal, long and slender. *Bractes* sub-sessile, cordate, acuminate, deciduous. *Verticels* of the raceme of four, many-flowered racemuli. This alone is an excellent specific character. *Corol, tube, throat*, and *upper lip* white; *under lip* boat-shaped, and of a light blue colour. *Filaments* smooth, united by pairs near the base, and without a process, as in the *ocymums.*

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3. P. *monadelphus. Roxb.*

Annual, fleshy, diffuse. *Leaves* oval, crenate, fleshy. *Racemes* before the flowers open strobiliform, from four imbricated rows of ovate, acuminate, concave, caducous bractes. *Nectary* gibbous. *Stamens* united.

A native of dry barren hills about Bangalore. From thence the seeds were sent by Mr. Heyne to the Botanic garden at Calcutta, where the plants grow luxuriantly, and blossom during the cool season.

*Root* annual. *Stem* short. *Branches* numerous, opposite, spreading, round, pale green, clammy, clothed with long soft hairs; the whole plant not above one foot high, but expanding three or four times as much. *Leaves* opposite, with smaller ones in their axills, short-petioled, oval, and obovate, fleshy, with the exterior margin crenate, from one to two inches long. *Racemes* terminal, solitary, erect, before the blossoms expand exactly four-sided; being thin, imbricated with four rows of broad, ovate-cordate, acuminate, concave, caducous bractes; after they fall off cylindric. *Flowers* numerous in approximate verticels of six (three on each side) large, and of a lively light purple colour. *Calyx* as in the genus, hairy, and the inside of its mouth shut with many hairs. *Corol* resupine. *Tube* with a somewhat gibbous base; *upper lip* four-parted, the *under* one ovate, concave, entire. *Filaments* as long as the lower lip of the corol, all the four firmly united for more than half their length, forming a tube, as in the diadelphous plants, for the style; a scale embraces the two lower seeds of the pistil.

The whole plant possesses a strong, though not disagreeable smell.

4. P. *aromaticus. Roxb.*

Perennial, villous. *Leaves* short-petioled, round-cordate, crenate, fleshy, downy, rugose, crenulate. *Spikes* solitary, verticelled. *Bractes* caducous.

*Hind.* and *Beng.* Pathur-choor.

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This most agreeably fragrant plant, is common in almost every garden in India, but very rarely found in flower; this viz. the beginning of June, is only the second time I have found it in that state in the Company's Botanic garden at Calcutta.

*Stems* creeping, round, succulent, perennial. *Branches* erect, round, very succulent, fragile, hairy, from one to two feet high. *Leaves* opposite, short-petioled, fleshy, fragile, broad-cordate, crenulate, a little hairy, rugose, particularly the under side; generally about two inches each way. *Spikes* terminal, erect, long, verticelled, before the flowers expand imbricated with four rows of caducous bractes. *Flowers* numerous, blue. *Perianth* hairy; *upper lip* broad, as in *Ocymum;* the *under lip* long, projecting, concave. *Filaments* conjoined, as in the diadelphous flowers, longer than the under lip, ascending, towards the apex distinct, the upper shortest.

The leaves, and indeed all parts of the plant, are delightfully fragrant, they are frequently eaten with bread and butter, also bruised and put into country beer, cool tankards, &c. being an excellent substitute for Borage.

5. P. *strobiliferus. Roxb.*

Annual, erect, four-sided. *Leaves* long-petioled, cordate, serrate, hairy. *Spikes* panicled, terminal, compact, strobiliform. *Lower lip* of the calyx short, and truncated. *Nectary,* scarcely any.

Katu-Kurka. *Rheed. Mal.* x. *t.* 90.

Lavendula *carnosa. Willd.* iii. 62.

It is annual, a native of the most shady clifts of the rocks, among the Circar mountains. It flowers during the wet and cold seasons.

*Stem* annual, erect, with few or no branches, four-sided, hairy, two feet high. *Leaves* opposite, spreading, petioled, broad-cordate, obtusely serrate, fleshy, rugose, hairy; about two or three inches long and two broad; there are gene-

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rally tufts of small leaves in the axills of the larger. *Spikes* terminal, often panicled, peduncled, imbricated until the flowering time, with four rows of bractes. *Bractes* oval, considerably longer than the unexpanded flowers, ciliate, spotted on the outside with small reddish dots. *Flowers* pretty large, beautiful, of a bluish purple. *Calyx* two-lipped; *upper lip* ovate, shutting down over the seeds like a lid, as soon as the flower drops; the *under lip* is short and truncate. *Corol; tube* compressed; the *upper* one short, erect, slightly three-toothed, the *under lip* is long and concave, in it the stamens rest. *Nectary* a scale, or lid, covering the lower half of the germ, issuing from the under side.

### *SCUTELLARIA. Schreb. gen. N.* 989.

*Calyx* with the mouth sub-entire, after inflorescense closed with a lid.

1. S. *indica. Willd.* iii. 175.

Annual. *Leaves* petioled, round-cordate, crenate. *Racemes* terminal, before the flowers expand imbricated with opposite, one-flowered, lanceolate, bractes of the length of the peduncles only.

Exclude *Serratula amara. Rumph. Amb.* xv. *t.* 170. *f.* 1. which I consider a *Gratiola.*

A native of the Moluccas, in the Botanic garden at Calcutta; it flowers during the cold season.

2. S. *peregrina. Willd.* iii. 174.

Herbaceous. *Stem* and *branches* four-sided. *Leaves* cordate, serrate, smooth. *Racemes* terminal, long, secund. *Bractes* petioled, ovate, entire, as long or longer than the calyx.

A native of Nepal. In the Botanic garden at Calcutta, it blossoms during the cold and hot seasons.

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## *COLEBROOKIA. Smith.*

Aggregate. *Common perianth* imbricated; *proper* beneath, five-cleft. *Corollets* one-petalled, irregular. *Germ* superior, four-lobed; *lobes* one-seeded; *attachment* inferior. *Seeds* four, naked. *Receptacle* naked.

1. C. *ternifolia.*

Shrubby, erect. *Leaves* three-fold, lanceolate, serrulate.

A native of Mysore, from thence the seeds were sent by Dr. Buchanan to the Botanic garden at Calcutta, where the shrubs blossom in February and March.

*Trunk* (in seven years old plants) short, thick, and woody. *Bark* light-brown, and pretty smooth. *Branches* three-fold, ascending; *young shoots* downy; height of the whole plant from five to eight feet. *Leaves* three-lobed, petioled, drooping, lanceolate, serrate, soft, with much very fine down, from four to six inches long, and from one to two broad. *Petioles* round, very downy, about an inch long. *Panicles* terminal, erect, composed of three-fold, cylindric aments, closely covered with numerous fascicles, of most minute, aggregate, white flowers, on a naked, flat, common receptacle, surrounded by a from ten to twenty-leaved common calyx, or involucre. *Calyx* deeply five-parted; *divisions* subulate, nearly as long as the corol, clothed with much, long, soft, fine, white wool. These divisions lengthen much, and become more woolly by the time the seeds are ripe, giving to the aments, or ramifications of the panicle, a much larger and more woolly appearance than when in blossom. *Corol* monopetalous. *Tube* short. *Border* four-parted; *upper divisions* emarginate; *under* three-parted, with the middle segments longer, and broader. *Filament* short. *Anthers* small, hid in the tube of the corol. *Germ* four-lobed, hairy. *Style* twice the length of the corol, half two-cleft, and the rest seems composed of two portions, as in *Perilla. Stigmas* two, acute. *Pericarp* none. *Seeds* four, obovate, hairy, adhering to each



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other, and to the calyx, the long, woolly segments of which readily carry them with the wind to a great distance.

2. C. *oppositifolia.*

*Leaves* opposite, broad-lanceolar, crenate.

A native of Nepal, from thence Dr. Buchanan sent the seeds to this garden, where the plants thrive well, and blossom in February.

*Trunk* short, soon dividing into many nearly erect branches, covered with ash-coloured bark, while young four-sided, with rounded angles, and very downy. *Leaves* opposite, decussate, short-petioled, broad-lanceolar, crenate, very soft and downy, and considerably wrinkled. *Stipules* none. *Panicles* terminal, with the *primary* branches opposite, supporting many cylindric, amentaceous spikes of nearly the same length. *Calyx; common perianth* many- (from four to twelve) flowered, many- (from eight to ten) leaved, imbricated, permanent. *Proper perianth* five-cleft; *divisions* filiform, hairy, the length of the tube of florets, their apices coloured, and less hairy. *Corol; universal* equal; *proper* one-petalled. *Tube* gibbous, border four-parted, the middle lobe of the lower division large, and nearly round, the upper broader and emarginate, unequal, remote. *Filament*, scarcely any. *Anthers* minute, hid in the mouth of the corol. *Germ* four-lobed. *Style* twice the length of the corol. *Stigma* two-cleft, acute. *Pericarp* none. *Seeds* four, lodged in the bottom of the enlarged hairy, proper perianth. *Receptacle* naked, flat.

*PRASIUM. Schreb. gen. N.* 992.

GEN. CHAR. *Berries* four, one-seeded. *Embryo* erect, without perisperm.

P. *melissifolium. R.*

Perennial, scandent. *Leaves* opposite, petioled, ovate, serrate. *Flowers* sessile, sub-verticelled.

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*Hursmun* the vernacular name in Silhet, where it is indigenous in the forests, flowering about the beginning of the rains. The seed ripens in September.

It is a plant of very slow growth, at least in the Botanic garden at Calcutta, between three and four years have only given one of a few inches in height. Though in Silhet, they are long, weak, scandent, or leaning, with four-sided, villous shoots.

*Flowers* crowded in the axills, large, drooping, yellow and villous. *Calyx* five-parted; *divisions* nearly equal, acuminate; as the berry advances to maturity, it splits into two; one two-parted, the other three parted; *upper lip* of the corol shorter and slightly emarginate; *under* broad, three-lobed, the middle one much longer. *Anthers* two-lobed, lateral. *Germ* four-lobed; *lobes* one-seeded; *attachment* sub-superior. *Style* about as long as the stamina and corol. *Stigma* bifid. *Berries* four, when all come to maturity, which is common, bright red, of the size of a small pea, convex on the outside, angular on the inner, pulp succulent, scarlet coloured. *Seed* single, conform to the berry, covered with a single thin white integument. *Embryo* erect, without perisperm. *Cotyledons* unequal, the *inner one* large, with a concavity in the exterior, lower half, for the reception of the small, oval, lenticular one.

## DIDYNAMIA ANGIOSPERMIA.

### *OROBANCHE. Schreb. gen. N.* 1045.

*Calyx* from bifid to four or five-cleft. *Corol* irregular. *Stigma* two-lobed. *Capsules* one-celled, two-valved, many-seeded.

1. O. *indica. Buch.*

Ramous, hairy. *Bractes* tern. *Calyx* sub-unilateral, five-cleft. *Upper lip* of the corol two-lobed; the *under* one three-parted; *anthers* woolly, two-lobed; *lobes* calcarate.



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Found by Dr. Buchanan in blossom in January in tobacco fields near Calcutta, adhering to the roots of the plants.

*Root* fibrous, some portion thereof adhering to the roots of *Nicotiana Tabacum.* *Stem* ramous, with a scale at the ramifications only; from six to twelve inches high, round, hairy, sometimes coloured, thickness varying from that of a goose-quill, to that of the finger; the lower half branchy, the upper half leaning. *Flowers* numerous, round the upper half of the branches, forming dense, sub-clavate spikes, they are pretty large, and blue. *Bractes* three-fold, one-flowered, hairy. *Calyx* one-leaved, five-cleft, hairy, open to near the base on the inside, where the flower presses on the branch; *divisions* subulate, half the length of the corol. *Corol* tubular, villous, the *upper lip* two-lobed, the under one three. *Filaments* smooth, except just at the base. *Anthers* two-lobed, the pairs united by woolly fibres, the lobes ending in a sharp hornlet. *Germ* ovate. *Style* rather longer than the filaments. *Stigma* of two, larger, fleshy lobes, with a perforation between them. *Capsule* ovate-oblong, two-valved, one-celled. *Seeds* very numerous, adhering to four longitudinal ridges on the inside of the capsule.

2. O. *acaulis. Roxb.*

Stemless. *Flowers* crowded into irregular heads, immediately on the roots. *Corol* five-parted, laciniate; *anthers* single, each of the inner pair augmented with a large recurved oval gland. *Stigma* peltate.

Found growing on the root of the China sugar-cane, in the Botanic garden at Calcutta, and in full blossom in September.

*Root*, I suspect annual; of many thick, firm fibres, adhering to the roots of the China sugar-cane. *Stem* none. *Flowers* numerous, short-peduncled, collected into a large, dense, fascicle, even with the surface of the earth, very large; colour, a beautiful lively purple. *Peduncles* short, round, smooth, one-flowered; *bractes*, a triangular, fleshy one, embracing the base of one or more peduncles, uniting them into

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a crown close to the root. *Calyx* one-leaved, length of the tube of the corol, fleshy, simple, opening on one side, or dividing into two unequal portions, on the outside tinged with red, on the inside white. *Corol* with the tube obliquely clavate-campanulate, smooth in every part; inside yellow; *throat* contracted and triangular; *border* five-parted, the capsule I have not seen yet, the divisions are nearly equal and about as long as the tube, margins laciniate. *Filaments* smooth. *Anthers* a larger, oblong, white gland is attached to the base of the inner pair which appears like a second anther. *Germ* ovate. *Style* rather longer than the stamens, curved, smooth. *Stigma* peltate, very large, somewhat three-lobed, glandular, slightly villous. *Capsule* ovate, one-celled, two-valved, with two pair of ramous receptacles, to which the numerous, very minute seeds adhere.

3. O. *pedunculata. Roxb.*

Smooth. *Stem* simple. *Flowers* long-pedicelled. *Calyx* spathiform. *Corols* five-parted; *filaments* naked. *Anthers* adhering by pairs, one of the pairs with a long fleshy appendage. *Stigma* cordate, peltate.

A native of Bengal; it appears during the rains, growing upon the roots of *Andropogon muricatus.*

*Stem* short; it may be called the common peduncl eof a raceme, which rises only an inch or two above the surface of the earth, clothed with a few tapering fleshy scales or leaves. *Peduncles* as long as the stem, ro und, smooth, erect, one-flowered. *Bractes* no other than the solitary triangular, one-flowered scales, or leaves of the stem. *Flowers* very large. *Tube* yellowish. *Border* deep, lovely violet. *Calyx* one-leaved, spathiform, opening by a single longitudinal slit on the interior side, fleshy, smooth on both sides, when young tinged with red, afterwards of a pale yellowish white, replete with a clear clammy liquor. *Corol* with an inflated, curved, yellow tube, as long as the calyx. *Border* five-parted; *divisions* nearly equal, and of a round reniform shape, with the

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margins finely dentate; the upper two less deeply separated, of such a charming deep violet that no artist can possibly do justice to the brilliancy of this flower. *Stamens* hid within the tube. *Filaments* nearly equal, smooth, the interior pair recurved over the posterior. *Anthers*, all the four firmly connected, the interior pair supported by the posterior pair of filaments; enlarged by a long horizontal fleshy appendage, into which the filaments are inserted. *Germ* ovate. *Style* shorter than the tube of the corol. *Stigma* broad-cordate, peltate. *Capsule* ovate, one-celled, two-valved. *Seeds* very numerous, very minute. *Receptacles* two pair, adjoined to the opposite sides of the capsule, ramous.

## *AEGENETIA. Roxb.*

*Calyx; spathe* one-leaved. *Corol* campanulate. *Capsule* one-celled, with various convolute receptacles; *seeds* numerous.

A. *indica. Willd.* iii. 347. *R. Corom. pl.* 1. *No.* 91.

Tsjem Cumulu. *Rheed. Mal.* xi. *t.* 47.

Orobanche *Aegenechia. sp. p.* 883.

A small, rush-like, naked, annual plant, a native of the hilly parts of the Circars.

*Root* a number of fleshy fibres, smooth, perfectly naked, intricately interwoven. *Scales* several, straight, round, except immediately at their base, where each is involved in a small sheath, about a foot long, one-flowered. *Leaves* none. *Flowers* large; of an elegant purple colour. *Calyx; spathe* oblong, pointed, opening length ways on one side. *Corol* one-petalled, with the bottom of the tube erect, pitcher-formed above, bent out through the spathe, horizontally gibbous; *border* five-parted; divisions equal, rounded. *Filaments* four. *Anthers* twin, united by pairs. *Germ* ovate. *Style* bent to correspond with the form of the corol, and the length thereof. *Stigma* headed. *Capsule* ovate, pointed,

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of the size of a filbert. Although I have examined it in all stages, yet I have never been able to fix upon any determined internal structure; there are a number of convoluted lamina throughout, between these are lodged innumerable, most minute seeds, like those of the *Orchideæ*.

*BUCHNERA. Schreb. gen. N.* 1035.

*Calyx* five-cleft. *Tube* of the corol long; *border* from four to five-cleft, unequal. *Capsule* two-celled, two-valved; *seeds* numerous.

1. B. *asiatica. Willd.* 337.

Erect, annual, four-sided. *Leaves* sessile, opposite, and alternate, linear, scabrous, entire. *Segments* of the lower lip of the corol oval, and rather acute.

Kalu polapeu. *Rheed. Mal.* ix. *t.* 66.

A small erect annual, a native of pasture ground, or such as has been lately in culture, appearing and flowering during the wet season.

*Stem* erect, from six to eighteen inches high, four-sided, scabrous. *Branches* one or two pairs, opposite. *Leaves* sessile; below opposite, above alternate, linear, erect, afterwards a little recurved, scabrous, about an inch long and one-eighth broad, those towards the extremities are very small, which makes them (the extremities) more like long spikes, than the extremities of the branches. *Flowers* axillary, solitary, sessile, of a middling size, white. *Branches* two, pressing on the calyx, laterally lanceolate. *Calyx* five-parted, striated, scabrous. *Corol; tube* rather longer than the calyx, curved at the apex; the *border* flat, two-lipped; *upper lip* broad, emarginate; the *under* one three-parted. *Capsule* covered by the calyx, opening at the apex; *receptacle* columnar.

There is a variety with exceedingly bright red flowers. Cattle do not like them.

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2. *B. euphrasioides. Vahl. Symb.* iii. 81. *Willd.* iii. 338.

Annual, erect, ramous, four-sided and scabrous. *Leaves* opposite and alternate, linear, scabrous, with short stiff bristles. *Corol* clavate. *Capsule* cordate, hid in the scabrous calyx.

A native of Prince of Wales' Island and the islands eastward of the Bay of Bengal.

*ACANTHUS. Schreb. gen. N.* 1065.

*Calyx* two-leaved, bifid; (in the East India species it consists of three pairs of leaflets). *Corol* one-lipped. *Anthers* bearded. *Capsule* two-celled, opening with elasticity across the partition. *Seeds* few.

1. A. *ilicifolius. Willd.* iii. 398.

Shrubby, armed. *Leaves* oblong, sinuate, spinous, dentate. *Spikes* terminal.

Aquifolium indicum. *Rumph. Amb.* iv. *t.* 71. *f.* 1.

Harikusa, the Sanscrit name.

*Beng.* Harcooch Kanta.

Paina schulli. *Rheed. Mal.* ii. *t.* 48.

A common shrub in and on the edges of salt or brackish lakes, marshes, &c. Flowers all the year on the coast of Coromandel. In Bengal during the rains.

*Roots* ramous. *Stems* many, erect; *branches* few; *bark* smooth. *Prickles* stipulary, four-fold, short, but very sharp. *Leaves* opposite, short-petioled, oblong, scolloped, waved, spinous, dentate, polished on both sides, of a firm texture, from four to six inches long, and about two broad. *Spikes* generally terminal, though sometimes from the axills also erect. *Flowers* solitary, opposite, large, blue, inodorous. *Bractes*, a single cordate, pointed one below each flower, it presses on the calyx, and seems a seventh leaflet thereof. *Calyx* as in the family. *Corol* many times longer than any of the leaflets of the apex, three-toothed. *Filaments* rigid. *Anthers*

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pressed closely together, linear, very hairy. *Capsule* oblong, ovate, smooth, size of an acorn, two-celled, two-valved, &c. as in *Barleria* and *Justicia*. *Seeds* two in each cell, obliquely cordate, compressed.

2. A. *madaraspatensis. Willd.* iii. 400.

Herbaceous, spreading flat on the ground. *Leaves* quatern, sessile, elliptic, sometimes remotely serrate. *Flowers* axillary, solitary, sessile. *Exterior calyx* of four pair of unequal, cuneate, ciliate leaflets; the *inner* one of two pair, not ciliate.

A native of Coromandel, where it flowers in the cold season.

*THUNBERGIA. Schreb. gen. N.* 1058.

*Calyx* double; the exterior one two-leaved. *Corol* irregular, one-petalled. *Germ* two-celled; *cells* two-seeded; *attachment* interior. *Capsules* with a long ensiform beak, two-celled, opening with elasticity contrary to the partition. *Seeds* solitary or paired. *Embryo* concave, with unequal cotyledons, and no perisperm.

1. T. *fragrans. Willd.* iii. 388. *Corom. pl. N.* 67.

Shrubby, twining, round. *Leaves* opposite, narrow.

*Teling.* Zeamandaree Tiga.

This plant is common in hedges, amongst bushes, &c. on the banks of water courses about Samulkota. I have not met with it elsewhere. Flowers during the wet and cold seasons; when cultivated it flowers all the year round.

*Root*, consisting of many thick, woody fibres. *Stem* and *branches* twining, woody, of considerable extent, two or three fathoms, jointed, and swelled there from the insertions of the leaves or their cicatrices, round; *bark* of a light ash-colour; *young shoots* downy. *Leaves* opposite, petioled, narrow, cordate, acute, behind toothed and slightly lobate, or angular, three-nerved, slightly scabrous, about three inches



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long by one and a half broad. *Petioles* about three quarters of an inch long, channelled, bent in various directions. *Stipules* none. *Peduncles* axillary, solitary, one-flowered, round, clubbed, downy; from one to two inches long. *Bractes* none. *Flowers* large, pure white. *Perianths* as in the genus, except that the leaves of the interior calyx are acute, and many-nerved. *Corol* salver-formed. *Tube* compressed, enlarged about the middle, a little hairy, longer than the interior calyx, bent to one side with a curve; *border* flat, five-parted; *divisions* equal, obovate, with their extremities lobed, and generally irregularly three-toothed; shorter than the tube. *Germ* superior, four-lobed, two-celled, with two ovula in each cell, attached to the middle of the partition. *Style* the length of the tube. *Stigma* funnel-shaped, two-lobed; *lobes* obcordate. *Capsule* sub-globular, flat, beaked, two-celled, opening from the base with an elastic jerk. *Seed* solitary, one in each cell, the other seldom or never ripens, round, rugose, with a large cavity, which penetrates two-thirds of the seed.

*Obs.* Dr. König on first discovering this plant, thought it a new genus and called it *Roxburghia rostrata*, but as soon as he saw the Supplement of the younger Linnæus, he found its character agree so well with that of *Thunbergia*, that he hesitated not to declare it a species of that genus.

The whole plant possesses a peculiar sort of agreeable fragrance, which with the beauty of its flowers, entitles it to a conspicuous place in the flower gardens.

2. T. *grandiflora. Roxb.*

Perennial, twining. *Leaves* cordate, angled. *Corol* campanulate, no inner calyx. *Anthers* bearded and clavate.

*Hind.* and *Beng.* Meel-luta.

Found amongst bushes and wild uncultivated places near Calcutta. Flowering time, the rainy season.

*Root* perennial, somewhat tuberous. *Stem* woody, twining up high trees, &c.; *young shoots* a little hairy, and slightly

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four-winged. *Leaves* opposite, petioled, spreading, cordate, often angle-lobed, pointed, from five to seven nerved, a little scabrous from small stiff white hairs on both sides; *floral leaves* of the racemes small, otherwise like the rest. *Petioles* erect, nearly as long as the leaves, swelled near the base, channelled, scabrous. *Stipules* none. *Peduncles* axillary, solitary, or paired; or in brachiate pairs, *i. e.* two or three pairs on terminal racemes, which if not supported, become beautifully bowing, like elegant festoons. *Peduncles* of the axillary flowers, and pedicels of the raceme, round, somewhat clavate, as long as the petioles, one-flowered. *Flowers* very large, being about four inches broad when expanded, colour a beautiful light blue. *Bractes* none. *Calyx; spathe* two-valved, obliquely-oblong, the under margins being more rounded and open; the upper almost straight, and slightly united, sometimes their whole length, though in general only near the apex, striated, pointed, a little hairy, and marked with small black dots, they are about as long as the tube and throat of the corol. *Corol* one-petalled, campanulate, sitting on a nectarial ring. *Tube* short and conical; *throat* ample, with a long, vaulted concavity on the upper side, where the stamens and style are lodged; on the opposite side is a large corresponding convexity, which is elegantly streaked with deeper and lighter blue. *Border* five-parted; *divisions* nearly round, the superior two erect, the inferior ones expanded. *Nectary* a large lobate body, surrounding the base of the germ, the corol inserted into it. *Stamens* within the throat. *Filaments* four, inserted on the mouth of the tube, interior pair much curved, and although longer than the other pair, yet from the curvature, their anthers are not more elevated than those of the other, or posterior pair; oblong, ovate, compressed, rugose. *Anthers* converging, equal, linear, erect, two-celled, margins of the cells bearded, as in *Acanthus;* each of the cells of the interior anthers, armed with a curved, sharp, rigid, white spur, exterior cell of the inner anthers armed in the same manner. *Germ* conical, somewhat



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four-sided. *Style* straight, length of the stamens. *Stigma* large, with a most uncommon perforation, which I compare to an inverted crescent, with a handle affixed to the centre of its concave side. *Capsule* globular, breaked, two-celled, two valved, opening from the apex. *Seed* when all come to maturity, two in each cell, roundish, compressed with a notched margin, tubercled and convex on the outside, concave and smooth on the inner.

It is one of the most elegant, showy, twining plants I have met with, and richly deserves a conspicuous place in the shrubbery.

*BARLERIA. Schreb. gen. N.* 1051.

*Calyx* of two dissimilar pairs of leaflets. *Corol* somewhat funnel-shaped. Two of the stamina minute. *Capsule* two-celled, two-valved, bursting with elasticity contrary to the partition.

1. B. *prionites. Willd.* iii. 376.

Shrubby; thorns axillary, four-cleft. *Leaves* broad-lanceolate, spinous, pointed, smooth, entire.

*Kooroontuka*, the Sanscrit name.

*Beng.* Kanta-jatee.

Coletta veetla. *Rheed. Mal.* ix. *t.* 41.

Hystrix frutex. *Rumph. Amb.* vii. *t.* 13.

Melampyro, &c. *Pluck. Alm. t.* 119. *f.* 5.

*Teling.* Mooloo govinda.

Is one of the most common, and at the same time elegant, small, shrubby plants in India; every soil and situation suits it equally well, and it is in flower all the year round.

*Stem* short, erect. *Branches* numerous, opposite, erect, round, smooth; the whole plant two or three feet high. *Thorns* or rather *prickles* axillary, generally about four, straight, slender, sharp. *Leaves* opposite, decussate, short-petioled, oblong, waved a little, mucronate, smooth. *Flowers*

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axillary, generally solitary, sessile, large, yellow. *Bractes* uncertain, when there are no thorns on the same axill there are two, opposite, linear, daggered, besides an undetermined number of very small ones. *Stamens*, the long pair projecting, their filaments compressed. *Stigma* entire, cylindric, open, pitted. *Capsule* conical, two-seeded, one seed in each cell.

2. B. *buxifolia. Willd.* iii. 377.

Shrubby, spreading. *Spines* simple, axillary, twin. *Leaves* round, with spinous joints. *Flowers* not long, sessile between the twin spines.

Cara-schulli. *Rheed. Mal.* ii. *t.* 47. bad, if for this plant.

A native of Malabar, Mysore, &c. from the latter country the seeds were sent by Dr. Buchanan in 1800 to the Botanic garden at Calcutta, where the plants thrive well, and are in blossom during the hot season.

*Stems* scarcely any, but several slender, variously bent, ramous; spreading branches; *young shoots* round and downy. *Leaves* opposite, sub-sessile, nearly round, entire, spinous, pointed, villous on both sides; about half an inch long, and nearly as broad. *Spines* in axillary pairs longer than the leaves, simple, slender, white and sharp, when they are in opposite axills they form a verticel of four, but it is only the older branches on which they are found in both. *Flowers* solitary, sessile in the forks of the spines, large, of a beautiful pink tinged with violet. *Stamens* the two with fertile anthers considerably longer than the tube of the corol, and in this species there are three short sterile filaments. *Capsule* elliptic, with two villous seeds in each cell.

3. B. *cristata. Willd.* iii. 378.

Unarmed, shrubby. *Leaves* sessile, broad, lanceolate, entire. *Flowers* axillary, sessile, one or two exterior leaflets of the calyces ciliate.

Found in gardens about Calcutta, and wild in the forests

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of Silhet. It is a large, very ramous shrub. Flowering time the cold season, during which period it is uncommonly gaudy; *young shoots* round, jointed, hairy. *Leaves* opposite, sessile, broad-lanceolate, entire, hairy, from two to three inches long. *Flowers* axillary, sessile, one or two, rarely more than three, large, of a beautiful bright blue. *Bractes* from two to three, subulate, hairy. *Calyx* four-leaved; *exterior pair* hairy, oblong and ciliated with strong bristles; *interior pair* much smaller, lanceolate and hairy. *Corol, tube* oblong, outside downy; *border* two-lipped, *upper lip* four-parted; the *under* one broader, but shorter and entire. *Nectary* a two-lipped cup, embracing the lower half of the germ. *Filaments* as in the family, with the addition of a small, fifth sterile one, all hairy. *Anthers* two-parted from below. *Styles* rather longer than the long filament. *Stigma* enlarged, perforated between two short rounded lips.

3. B. *ciliata. Roxb.*

Unarmed, shrubby, with few long spreading branches. *Leaves* lanceolate. *Flowers* axillary, sessile, solitary or in pairs.

A native of the interior parts of Bengal and from thence sent by Dr. W. Carey, to the Botanic garden at Calcutta, where it blossoms about the beginning of the cold season.

*Stems* scarcely any, but several long slender diffuse, straggling branches and branchlets, which makes it rather a naked plant, when compared with the species formerly described by me under the name B. *cristata*, though I must now acknowledge the species before me agrees better with Osbeck's figure than that does. *Leaves* opposite, sub-sessile, lanceolate, frequently recurved, a little hairy, entire, about two or three inches long, and half an inch broad. *Flowers* axillary, solitary or in pairs, large, pink, with a slight tinge of purple. *Bractes* ensiform, often ciliate. *Calyx, leaflets* two pairs; *exterior pair* lanceolate, nervose, ciliate; *inner pair* small and ensiform. *Corol, upper lip* of four broad, entire divisions;

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the *under* one slightly emarginate. *Capsule* with one or two hairy seeds in each cell.

4. B. *dichotoma. Roxb.*

Unarmed, shrubby. *Leaves* petioled, broad-lanceolar. *Flowers* collected in the axills, on short recurved dichotomous spikes; exterior pair of the leaflets of the calyx ciliate.

*Beng.* Sada-jatee.

Found in a Hindoo's garden near Calcutta, where indigenous I could not learn. Flowering time the cold season.

*Trunk* scarcely any, but numerous opposite and decussated branches, and somewhat hairy branchlets; height from four to eight feet. *Leaves* opposite, petioled, lanceolate, oblong, entire, somewhat hairy on both sides. *Flowers* large, pure white, collected on very short, solitary, dichotomous, recurved, axillary spikes, two or three standing erect on the upper or convex side of each spikelet, with a single one in the fissure; they are all embraced by several, linear, pretty long bractes. *Calyx*, &c. exactly as in *Barleria cristata.*

5. B. *cærulea. Roxb.*

Shrubby, unarmed, straight. *Leaves* sub-sessile, oblong, waved. *Flowers* in imbricated, axillary, and terminal fascicles. *Exterior leaflets* of the calyx ovate, scollopped and ciliate.

*Beng.* Dasee.

Justicia fasciculata of Dr. König's Mss.

Barleria strigosa. *Willd.* iii. 379.

A middle-sized, erect, flowering shrub, cultivated in our garden, for the sake of its numerous, beautiful, large, light blue flowers. It is a native of the shady moist vallies, up amongst the mountains, through the Circars, also of Bengal. Flowering time the cold season.

*Roots* branchy. *Stems* and *branches* many, erect, round, jointed; swelled above the joints, a little scabrous, from two to four feet high. *Leaves* opposite, short-petioled, oblong,

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pointed, waved, a little scabrous, from four to five inches long, and from two to two and a half broad. *Spikes* short, axillary and terminal, recurved, bearing the flowers on the upper or convex side. *Bractes* one or two to each flower, placed on the outside, oblong, pointed, nervous, waved, dentate, ciliate. *Flowers* large, blue, placed alternately in two rows. *Calyx* four-leaved; *exterior pair* large, pointed, dentate, ciliate, waved; *inner pair* lanceolate, small. *Nectary* a cup surrounding the base of the germ. *Filaments*, a fifth sterile, between the short pair of stamens. *Capsule* litlet more than half the length of the exterior calyx. *Seeds* two in each valve.

6. B. *longiflora. Willd.* iii. 379.

Unarmed, shrubby. *Leaves* ovate-cordate, entire, sericeous. *Exterior leaflets* of the calyx cordate, scariose. *Tube* of the corol long.

A singularly looking, shrubby species, a native of hills, and the lower region of mountains.

*Stem* very short, woody; *bark* whitish; *branches* very numerous, below opposite, above alternate, spreading, from two to four feet high. *Leaves* opposite, petioled, cordate, entire, covered with much soft white down, from one to two inches long, and one or one and a half broad. *Flowers* axillary, solitary, alternate, short-peduncled, white, in the opposite axill is a branchlet, the flowers occupying those axills on the upper side, and the branchlet those on the under. *Bractes* two, opposite, linear-lanceolate, revolute. *Calyx* four-leaved; the *exterior* two opposite, large, cordate, reticulated, chaffy, waved; the *interior* two also opposite, but many times smaller, lanceolate and concave. *Corol; tube* very long, from four to six inches, filiform, bent a little; *segments* of the border flat, equal, obcordate. *Anthers*, the superior pair somewhat sagittate; the inferior small and two-lobed. *Stigma* clavate, somewhat three-sided, funnel-formed, glutinous. *Seeds* four, two in each cell, silky.

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*Obs.* Dr. König's bractes are my exterior leaflets of the calyx, but his *flores terminales* I cannot account for, and there is no mistake in the plant, for I was with him when he discovered and first described it. It looks well while young, but afterwards it has rather a scraggy appearance; I have had it in my garden many years.

*RUELLIA. Schreb. gen. N.* 1050.

*Calyx* five-parted. *Corol* somewhat campanulate, by pairs. *Capsule* two-celled, two-valved, bursting with elasticity contrary to the partition.

1. R. *infundibuliformis. Roxb.*

Shrubby. *Leaves* oblong, four-fold. *Spikes* four-sided. *Bractes* three-fold. *Calyx* five-leaved. *Corol* with unilateral border; *seeds* scaly.

Justicia infundibuliformis. *Willd.* i. 99.

Manja Kurini. *Rheed. Mal.* ix. *t.* 62.

A pretty large, erect, ramous shrub; commonly found cultivated in the Pagoda gardens, where it flowers all the year round. *Leaves* four-fold and staid at the joints of the branchlets, spreading, petioled, oblong, pointed, waved, running down the petiole, slightly pubescent, about two or three inches long, and one and a half broad. *Petioles* channelled, about an inch long. *Spikes* axillary, erect, long-peduncled, four-sided; *angles* sharp, from the sharp points of the bractes always ending there. *Bractes* oblong, jointed, keeled, ciliate, one-flowered. *Bractioles* two, subulate, placed on each side of the calyx. *Flowers* numerous, pretty large, of a bright orange colour. *Calyx* five-leaved, the three exterior largest. *Corol; tube* filiform, curved like the letter S; *border* irregularly five-cleft. *Filaments* four, short, curved, two of them shorter. *Anthers* oblong, within the tube. *Pistillum* as in the genus. *Seeds* two in the cell, with chaffy, torn scales.



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2. R. *Zeylanica. Kön. Mss. B. H.*

Shrubby, scandent. *Leaves* cordate. *Racemes* terminal, becoming lateral, round. *Capsules* clavate; *seeds* one or two in each cell, with a thick double, dentate margin.

Valli upu dali. *Rheed. Mal.* ix. *t.* 45.

A native of Coromandel, and in flower and fruit great part of the year. *Stem* not easily distinguished from the innumerable branches, which spread or climb in every direction to a very considerable extent, and by age become ligneous; the parts that rest on the ground strike root at the joints; *young shoots* pretty smooth and somewhat four-sided. *Leaves* opposite, petioled, cordate, entire, rather obtuse, pretty smooth, texture soft, from one to three inches long. *Petioles* toward the apex winged; length one-third that of the leaves. *Racemes* terminal, but becoming lateral by the time the seeds are ripe, as the branches lengthen on one side thereof, from six to twelve inches long, slightly incurvate, round. *Rachis* four-sided. *Flowers* short pedicelled, solitary, rather remote, large, white or pale blue purple; for there are two varieties constituted by the colour of the flowers only. *Bractes* tern, at the base of each pedicel, and one opposite to these on the opposite side of the rachis, small, triangular, permanent. *Calyx* to the base five cleft. *Segments* ensiform, acute; *corol* with short tube, compressed, campanulate throat, and subequal border, of five nearly equal, sub-rotund segments. *Filaments*, the pairs united below the middle. *Germ* sitting in a fleshy nectarial cup, oblong, two-celled, with two seeds in each. *Stigma* rather large, slightly two-lobed, umbilicated. *Capsules* clavate, villous, a full inch long. *Seeds* one or two in each cell, rugose, with thick, double, dentate margins. The rest as in other *Acanthoideæ.*

3. R. *racemosa. Roxb.*

Herbaceous, erect, the tender parts villous. *Leaves* petioled, broad lanceolate, rather blunt, entire. *Racemes* terminal. *Corol* cylindric, campanulate; *divisions* of the border

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equal and roundish. *Anthers* twin. *Capsule* linear, oblong, many-seeded.

Found by Dr. Hunter, and Mr. Roxburgh in Pulo Pinang, under the shade of trees, in flower in June.

4. R. *comosa. Roxb.*

Shrubby, ramifications crowded, very hairy. *Leaves* ovate-oblong, serrate, cuspidate, one much larger. *Spikes* axillary, imbricate, with decussate, ciliate, cuneiform bractes. *Calyx* two-cleft. *Corol* obliquely campanulate.

A native of the Molucca Islands, from thence introduced into the Botanic garden at Calcutta, where in seven years the plants grew into large, very ramous, high, spreading bushes, and then blossomed for the first time during the rainy season.

*Trunk* scarcely any. *Branches* numerous, much divided, crowded, spreading in every direction. *Young shoots* round, hairy, and swelled at the joints. *Leaves* opposite, long-petioled, one of the pairs much smaller, ovate, oblong, serrate, cuspidate, very hairy, length of the largest about five inches by two and a half, and its companion scarcely half the size. *Spikes* axillary, solitary, short peduncled, scarcely so long as the petioles, imbricated with decussate, ciliate, cuneiform, cuspidate *bractes*, those of the calyx opposite, similar in shape, but much smaller. *Flowers* large, purple. *Calyx* deeply two-cleft, very hairy; the *upper segment* three-toothed; the *under* one two-toothed. *Corol* of an oblique, narrow, campanulate form, with its border divided into five, short, broad, emarginate, nearly equal, somewhat crenulate segments. *Capsule* lanceolate, hairy, four-seeded.

5. R. *flava. Roxb.*

Shrubby, smooth, petioled, oblong, ventricose, tapering most at the base, sub-entire. *Spikes* terminal. *Flowers* narrow, campanulate, sub-equal.

A very pretty, small shrub when in flower, found by the



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Rev. Mr. F. Carey in the vicinity of Rangoon in Pegue, where it is called *Pretchee*. *Branchlets* straight, smooth, and in the dry specimens tending to be four-sided. *Leaves* opposite, petioled, oblong, ventricose, margins rather uneven, smooth on both sides, six inches long. *Spikes* terminal, crowded with bractes, and larger, yellow, opposite, sessile flowers. *Rachis* four-sided and smooth. *Bractes* a lanceolate one under each flower and two smaller ensiform ones pressing on the sides of the calyx and longer than its segments. *Calyx* five-parted. *Segments* ensiform. *Corol* irregularly narrow, campanulate. *Border* of five nearly equal, semicircular lobes. *Filaments* the longer pair most ciliate on the outside. *Anthers* linear, and the opposite pairs firmly united. *Germ* oblong. *Stigma* of two very unequal lobes.

6. R. *ringens.*

Perennial, creeping or climbing. *Leaves* oblong, ventricose, hairy. *Flowers* axillary, short-peduncled. *Floral leaves* longer than the calyx. *Capsule* clavate. *Seeds* imbricated.

Upu dali. *Rheed. Mal.* ix. *t.* 64. has the divisions of the border of the corol too long and too sharp for my plant.

Is common in thickets, &c. over most part of India, and is in blossom the greatest part of the year. Compare with Vahl's R. *pallida. Symb.* ii. 72.

*Stems* or *branches* diffuse, climbing or creeping just as they meet with support, woody. *Young shoots* erect, somewhat four-sided, and hairy. *Leaves* opposite, short-petioled, ovate, oblong, entire or slightly scollopped, pale green and hairy on both sides. *Flowers* axillary, solitary, short-peduncled, large; colour, a beautiful pale blue, they expand in the evening and droop in the morning. *Floral leaves*, (bractes,) like the other leaves, but smaller, one on each side of the middle of the peduncle, from their axills other flowers often succeed. *Calyx* with very long, slender, bristle-like, hairy divisions. *Corol* bell-shaped, almost regularly five-parted.

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*Filaments* united by pairs near the base. *Stigma* entire, broad, glandular. *Capsule* club-shaped, with many compressed imbricated seeds in each cell.

7. R. *cernua. Roxb.*

Shrubby, erect, polished. *Leaves* opposite, drooping, petioled, ovate lanceolate, acuminate.. *Flowers* axillary, subsessile. *Bractes* petioled. *Capsule* clavate, many-seeded.

Moretiana. *Rumph. Amb.* iv. *t.* 23. *f.* 1.

Reared in the Botanic garden at Calcutta from seed sent by Dr. Buchanan from Mysore, where the plant is indigenous. Flowering time in Bengal the rainy season.

*Root* perennial. *Stems* in a cultivated state several, subligneous, erect, round, smooth, swelled immediately above the joints. *Branches* opposite, alternately smaller, sub-erect, smooth, obscurely four-sided, the whole plant about three feet high. *Leaves* opposite, petioled, drooping, alternately smaller, ovate, lanceolate, slightly repand, long, taper, recurved, pointed, smooth on both sides; size very various, the larger often from two to four inches long. *Flowers* axillary, from one to three, sub-sessile, small, pale pink, their insertions surrounded with some opposite pairs of small floral leaves and lanceolate petioled bractes. *Calyx* five-cleft. *Corol* campanulate, *lower lip* larger and more deeply coloured, the other four equal. *Stigma* clavate, curved. *Capsule* clavate, many-seeded.

8. R. *patula. Willd.* iii. 364.

Perennial. *Leaves* ovate, scollopped, downy; peduncles axillary, three-flowered. *Filaments* united by pairs, from the middle downwards. *Capsules* clavate, many-seeded. It delights in rubbish, shady corners, &c. in the vicinity of Negapatam. Flowers during the cold season.

*Root* woody, perennial. *Stems* many, sometimes resting on the ground, rooting, and sometimes nearly erect, very ramous, woody, and round jointed. The younger parts downy.

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about two feet high. *Leaves* opposite, petioled, ovate, a very little scollopped, waved, downy, somewhat glutinous; about an inch or one and a half long and broad. *Petioles* compressed, downy, half the length of the leaves. *Peduncles* axillary, short, generally three-flowered. *Bractes* leaf-like, but smaller, and narrow in proportion. *Flowers* pretty large, very pale blue. *Filaments* united by pairs from the middle downwards. *Stigma* large, particularly the *under lip*. *Seeds* about six in each cell, imbricated, margins woolly.

The plant has a weak, but pleasant, fragrant smell.

9. R. *hirta. Vahl. Symb.* iii. *p.* 84. *t.* 67.

Perennial, creeping, four-sided, hairy. *Leaves* oblong, crenate, bristly. *Heads* terminal, surrounded with lanceolate bractes. *Capsules* linear.

A native of various parts of India, and found chiefly in shady places. Flowers during the cold season.

*Root* woody, perennial. *Stem* often creeping, branchy, four-sided, very hairy, from one to two feet long. *Leaves* opposite, sub-sessile, oblong, crenulate, covered with stiff brown hairs, about two inches long and one broad. *Floral leaves* four-fold. *Flowers* terminal, several forming one or more globular heads, large, bluish purple. *Bractes* involucre-like, linear, very hairy. *Corol*, divisions of the border equal, obliquely oval, as in the contorted flowers.

There is a variety of this species, with white flowers.

10. R. *latebrosa. Roxb.*

Herbaceous, creeping, round, hairy. *Leaves* oval, sub-sessile, crenate. *Flowers* axillary, solitary, and in terminal, bracted heads; *corol* nearly regular. *Capsule* lanceolate, many-seeded.

A small creeping, herbaceous plant, growing in shady uncultivated places, under bushes, &c. Flowers during the cold and the beginning of the hot season.

*Root* perennial. *Stems* several, creeping, round, hairy,

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from six to twelve inches long. *Leaves* opposite, short-petioled, broad, oval, serrate or notched, hairy, about an inch long, and three quarters of an inch broad. *Flowers* axillary, solitary, sessile, light blue, they are also collected in small, terminal, bracted heads, of from four to six flowers each. *Corol; tube* twice the length of the calyx, contracted about the middle. *Capsule* lanceolate, many-seeded.

11. R. *flagelliformis.*

Herbaceous. *Shoots* diffuse. *Radical leaves* petioled, oblong, and obtuse; *cauline* remote, sub-sessile, and nearly round. *Flowers* axillary, crowded, sessile. *Anthers* twin. *Capsule* linear, many-seeded.

A native of the Moluccas.

12. R. *Pavala. Roxb.*

Suffrutex, very ramous, diffuse. *Leaves* ovate, pointed, serrate. *Spikelets* axillary, and terminal, sub-sessile. *Corol* with a regular, five-parted border.

*Teling.* Pavala.

This plant is in general so like R. *fasciculata*, the flowers excepted, that our description, except that of the flowers, may serve for both.

It is a native of the same places, and flowers during the cold season.

*Spikelets* terminal, and axillary, sub-sessile, oblong. *Bractes* opposite, oblong, downy, margins slightly fringed with hairs, one-flowered. *Flowers* small, bright, but deep blue. *Corol; tube* curved, widening from the base to the top, in the last it is gibbous, &c. *divisions* of the border equal; in the last it is grinning.

The plant has a strong disagreeable smell.

13. R. *bracteata. Roxb.*

Shrubby, straight. *Leaves* ovate, pointed, serrate. *Flowers* axillary, solitary or racemed. *Bractes* cordate, chaffy. *Corol* campanulate. *Capsules* two-seeded.

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A shrubby species, a native of the mountains. *Stems* several, woody, straight, spreading, round, smooth, jointed; length and thickness various. *Bark* light, ash-coloured. *Branches* few, stem-like. *Leaves* opposite, petioled, ovate, serrate, pointed, pretty smooth. *Peduncles* axillary, solitary, one-flowered, or in luxuriant plants they are on small axillary racemes, like leafy branchlets. *Bractes* two, opposite, sessile, cordate, pointed, concave, chiefly veined; within them the proper five-parted perianth is hid. *Flower* white, large. *Corol; tube* gibbous; *border* sub-equal. *Anthers* twin, the lower point of each ends in an incurved spur. *Capsule* oval, two-seeded.

14. R. *fasciculata. Willd.* iii. *p.* 1. 369.

Suffrutex, very ramous, diffuse. *Leaves* sub-rhombiform, decurrent, pointed, serrate. *Spikelets* sub-panicled. *Corols* ringent; *tube* gibbous; *anthers* twin.

A small, diffuse, very ramous, under shrub, a native of the hilly country. Flowers during the cold season.

*Root* perennial. *Stems* and *branches* numerous, and are so intermixed that there is no making a distinction; diffuse, those next the ground strike root at the joints, four-seeded, a little hairy, from one to two feet long. *Leaves* opposite, petioled, oblong, pointed, with the anterior margins serrate, running down to near the base of the petiole, a little downy, from two to three inches long, and from one to two broad. *Spikelets* ovate, small, numerous, panicled, peduncled, axillary, and terminal. *Bractes* lanceolate, imbricate. *Flowers* numerous, small, white. *Corol* grinning; *tube* bellied, contracted at the mouth; *upper lip* short, emarginate; the *under* one broader and three-parted. *Filaments* inserted into the mouth of the tube. *Anthers* twin, the *superior pair* oblong, and placed laterally; the *inferior* globular, one above the other.

15. R. *imbricata. Willd.* iii. 366.

Perennial, diffuse. *Leaves* long-petioled, obliquely ovate.

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*Racemes* secund. *Bractes* solitary, reniform, ciliate, many-flowered; *upper segments* of the calyx very hard, lanceolate.

Found wild in shady places in the vicinity of the Botanic garden near Calcutta. It blossoms during the cold season. and its seed ripens in March.

*Stem* scarcely any, but numerous, sub-opposite, jointed, weak, straggling branches, often resting on the ground, and in that case roots issue from the joints. *Leaves* opposite, long-petioled, one of the pair always considerably smaller, obliquely ovate-oblong, taper-pointed, crenulate-serrate, tolerably smooth on both sides; size very various. *Racemes* axillary, and terminal, short, secund. The reniform bractes, with their flowers occupy the outside, while on the inside are just as many, opposite pairs, of very unequal (sized) floral leaves; in the axills of the largest of these, the alternate, reniform bractes with their flowers are inserted. *Bractes* axillary, solitary, short-peduncled, reniform, clothed with long, soft, glutinous hairs, each embracing from two to six, or more small, white flowers. *Calyx* five-cleft; *upper* division large, rather longer than the bractes, broad-lanceolate, the inferior four subulate, all are hairy, and clammy, like the bractes. *Corol* bilabiate; the *upper lip* bifid, the *under* one trifid. *Capsule* four-seeded.

16. R. *dependens. Roxb.*

Suffruticose, erect, very ramous. *Leaves* hanging, broad-lanceolate, serrulate. *Spikes* terminal, sessile, crowded, secund, imbricated. *Bractes* lanceolate, ciliate.

A native of Mysore. Flowering time, the rainy season.

*Stem,* scarcely any thing like one, but numerous straight branches with alternate, erect, somewhat four-angled, coloured, smooth branchlets; the height of the whole plant about two feet. *Leaves* opposite, petioled, drooping, alternately smaller, broad-lanceolate, margins entire, most slightly villous underneath, from one to four inches long. *Petioles* with a continuation of the base of the leaf, very various in length,



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a little hairy. *Spikes* terminal, crowded, sessile, sub-cylindric, secund. *Bractes*, on the back of the spike are two rows, of alternate, bifarious, lanceolate, spinous-pointed ciliate ones; on the floriferous side three similar ones to each flower. *Calyx*, to the base five-cleft; *divisions* unequal, ciliate. *Corol* ringent; *tube* as long as the calyx, gibbous; *upper lip* shorter, smaller and deeply emarginate; the *under* one three-parted, recurved. *Anthers* united by pairs. *Capsule* short, ensiform, with two seeds in each cell.

17. R. *salicifolia. Willd.* iii. 374. *Vahl. Symb.* 384.

Annual, sub-erect. *Leaves* lanceolate, serrate. *Flowers* sessile, fascicled in alternate axills. *Corols* ringent, erect. *Bractes* lanceolate.

Is very much like *Barleria longifolia;* it is annual or biennial, and a native of the same wet swampy places as that plant. It flowers during the wet season.

*Stem* towards the base resting on the ground, and there striking root at the joints, above erect, round, smooth, jointed. *Leaves* opposite, sub-sessile, lanceolate, slightly serrate, crenulated, or waved, smooth; about three inches long, and half an inch broad. *Flowers* sessile, from two to six in each alternate axill, light-blue; in the opposite axill there is generally a small branchlet. *Bractes* several, lanceolate, slightly ciliate. *Calyx* five-parted. *Corol* ringent. *Capsules* long, round, smooth. *Seeds* small, very numerous.

18. R. *longifolia. Roxb.*

Herbaceous. *Leaves* verticelled, lanceolate, hairy. *Spines* of the verticells six-fold.

Gecantaca, its Sanscrit name. See *Asiat. Res.* v. *p.* 291.

*Beng.* Kanta koolika.

Barleria longifolia. *Linn. sp. pl. ed. Willd.* iii. 375.

Bahel-schulli. *Rheed. Mal.* ii. *t.* 45.

Is common in low wet places all over India. Flowering time, the cold season.

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*Roots* often biennial. *Stems* herbaceous, ascending, or erect, ramous, jointed, a little flattened, hairy, from two to three feet high. *Branches* opposite, like the stem, and also nearly erect. *Leaves*, an exterior, opposite, sessile pair at each joint, within these, and sub-alternate with the spines, several small ones in a verticel; all are linear-lanceolate; margins often revolute, hairy, I may almost say bristly; size various. *Spines* six in each *verticel*, between the leaves and flowers, awl-shaped, spreading, and a little recurved. *Flowers* verticelled, numerous, sessile, large, of a bright-blue, or in some varieties, rose-coloured. *Bractes* lanceolate, margins and outside bristly. *Calyx* of two pairs of nearly equal leaflets, clothed with soft hair. *Corol* two-lipped; *lips* nearly equal; *upper* two-parted, with the division emarginate; the *under* one three-parted, with the divisions also emarginate, in the under a coloured body like a large oblong anther. *Filaments* connected at the base; second pair larger than usual in the genus. *Anthers* sagittate. *Stigma* subulate, involute, with a fissure on the upper side.

19. R. *hirsuta. R.*

Annual, erect. *Leaves* lanceolar, entire, hirsute. *Flowers* sessile, crowded in both axills. *Bractes* numerous, linear, and with the five acute segments of the calyx very hairy.

A native of Chittagong.

20. R. *obovata. R.*

Annual. *Leaves* short-petioled, from oval to obovate, cuneate, obtuse, hairy. *Flowers* axillary, crowded, sessile. *Bractes* and *calyx* ciliate. *Corol* ringent. *Capsule* cylindric, smooth, many-seeded.

Nir schulli. *Rheed. Mal.* ii. *t.* 46.

Found in moist situations in the province of Chittagong. Flowers about the close of the rains, and the seed ripens in February and March.

This species certainly agrees much better with Van Rheed's



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figure above quoted, than the short descriptions of R. *diffor-mis, Suppl.* 289. *Willd.* iii. 374.

21. B. *uliginosa. Willd.* iii. 371.

Annual, diffuse. *Leaves* opposite lanceolate. *Spikes* terminal, four-sided. *Flowers* opposite, with three orbicular bractes to each. *Corols* ringent. *Capsules* linear; *seeds* numerous.

Is very common on dry rice grounds, during the dry season.

*Stem* annual, weak, straggling, ramous, four-sided, jointed, smooth, of a purplish colour, about a foot long. *Branches* opposite, and like the stem. *Leaves* opposite, remote, sessile, lanceolate, entire, smooth, size various, often coloured. *Spikes* terminal, long, four-sided. *Flowers* opposite, decussated, blue, each embraced by the sessile, orbicular bractes. *Calyx* five-cleft. *Corol* ringent. *Anthers* two-cleft at the base. *Stigma* simple. *Capsule* linear, oblong. *Seeds* numerous, small, round, of a shining brown.

22. R. *triflora. R.*

Annual, creeping, hairy. *Leaves* cordate, serrate, or pinnatifid. *Flowers* verticelled. *Corols* ringent. *Seeds* numerous.

A native of ditches, low ground, &c. in Bengal; it appears during the cold season.

*Stems* creeping, with leaf and flower-bearing extremities, erect, hairy. *Leaves* opposite, the most inferior longer-petioled, ovate-cordate, serrate, hairy, from one to two inches long. *Flowers* axillary, three-fold, one a common short peduncle, pretty large and of a pleasing deep-rose, or purple colour. *Bractes* oblong, hairy, four or five to each fascicle of flowers. *Calyx* hairy, five-parted; *divisions* long, narrow and acute. *Corol* ringent; *upper lip* vaulted, two-parted; the *under* one expanding, broader, three-parted. *Anthers* bifid. *Stigma*

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two-parted, one division much longer and hooked. *Capsule* linear, as long as the calyx. *Seeds* numerous.

23. R. *suffruticosa. R.*

Suffruticose, erect, hairy. *Leaves* short petioled, lanceolate, obtuse, ciliate. *Flowers* terminal, solitary, sessile. *Corol* with a long slender tube, and sub-regular border. *Capsules* oblong, few-seeded.

A small, erect, ramous under shrub, of about one foot in height, with large, terminal, white flowers, which appear during the rainy season; opening at sun-set, and dropping in the morning.

A native of the district of Dinagepore, &c.

## *LEPIDAGATHIS. Willd.*

*Calyx* of two opposite, unequal pairs of leaflets, ringent; the *upper lip* small, the *under* one three parted. *Anthers* twin. *Capsule* two-celled, two-valved, bursting with elasticity contrary to the partition.

L. *cristata. Willd.* iii. *p.* 400.

Perennial, diffuse. *Leaves* opposite, sessile, lanceolate. *Inflorescense*, a dense head close to the crown of the root.

The generic character is but little removed from *Barleria*, but the habit of the plant is very different. It is a native of elevated, dry, barren ground, all over the coast of Coromandel. Flowering time, the rainy and cold season.

*Root* perennial. *Stem* scarcely any, but several, long, slender, opposite, diffuse, four-sided, ramous, smooth branches, spreading close on the ground, and often striking root. *Leaves* opposite, sessile, lanceolate, entire, sometimes villous or even hairy, and scabrous; from one to three inches long and half an inch or less broad. *Inflorescense* in large, variously shaped, densely imbricated heads, close to the earth, near the root, with smaller ones scattered over the joints of the large

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branches. *Bractes* numerous, imbricated, lanceolate, ciliate, pointed. *Flowers* numerous, small, of a rose colour. *Calyx* of two pairs of unequal leaflets, the *exterior* pair much larger, with the lower leaflets bidentate, all are hairy and ciliate. *Corol* one-petalled, ringent; *tube* gibbous, with the mouth contracted. *Throat* campanulate; the *upper lip* erect, emarginate; the *under lip* large, three-parted; middle division broad, emarginate, a little curled, and more deeply coloured. *Filaments* within the throat of the corol. *Anthers* twin. *Germ* ovate, elevated on a glandular receptacle. *Style* sufficiently long to elevate the small stigma even with the anthers. *Capsule* ovate, acute, sessile, two-celled, two-lobed, bursting with elasticity, as in *Justicia*, *Barleria*, &c.

## *ROSCOEA. R.*

GEN. CHAR. *Involucre* few-flowered. *Calyx* tubular. *Corol* irregular. *Stamina* very long, and distinct. *Germ* four-celled; *cells* one-seeded; *attachment* superior. *Berry* one-seeded. *Embryo* erect, without perisperm.

1. R. *pentandra. R.*

*Involucre* six-leaved, six-flowered. *Flowers* pentandrous. *Stigma* bifid. *Leaves* opposite, from ovate-oblong to lanceolate, smooth.

Kungea, the Bengalee name.

A large, climbing, permanent shrub, a native of the forests near Silhet, where it flowers in February, March, and April, and the seed ripens during the rains.

*Trunk* ligneous, soon dividing into many long, scandent, woody branches, covered with rough ash-coloured bark. *Branchlets* opposite, the tender shoots villous; the ligneous ones scabrous, very small, and villous. *Stipules* nothing more than a villous ridge. *Panicle* axillary, and terminal, the terminal one large, and composed of several pairs of opposite, spreading, four-sided, villous branches. *Umbellets* opposite,

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solitary, long-peduncled. *Bractes* like the leaves, but much smaller and villous, one under each of the opposite peduncles, which support the umbellets. *Involucre* six-leaved, and about six-flowered; *leaflets* spreading, linear, obtuse, smooth, veined, much longer than the flowers. *Flowers* sessile, purple, inodorous. *Perianth* proper, campanulate, entire, ribbed, villous, permanent. *Corol* one-petalled; *tube* short; *throat* very woolly. *Border* of five or six spreading, sub-rotund, nearly equal divisions. *Filaments* five, or sometimes six, corresponding with the segments of the border of the corol, unequal, inserted within the mouth of the tube, much longer than the corol and variously bent. *Anthers* two-lobed, cordate. *Germ* superior, hairy, two-celled, the cells more than half divided by incomplete partitions which project from the centre of the complete one. *Ovula* four, one in each cell, attached from the apex to the top of the axis. *Style* the length of the stamina. *Stigma* bifid. *Berry* superior, globular, hairy; half hid in the calyx, of the size of a small pea, one-celled. *Seed* solitary, conform to the berry. *Integuments* two. The *exterior* one is the cortex of the berry; the *interior* one membranaceous. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed, nearly equal, the line of separation serpentine. *Radicle* small, inferior.

2. R. *villosa. R.*

*Involucre* three-leaved, from five to ten-flowered. *Stigma* bidentated. *Leaves* opposite, cordate, downy. *Anthers* two-lobed. *Stigma* slightly two-parted. *Berry* dry, top-shaped, four-partible, each part one-seeded.

The leaves of these plants have a strong, heavy, disagreeable smell; they are used for fomentation by the natives.

A stout extensive, scandent shrub; it is a native of Pegue in the vicinity of Rangoon. The Rev. F. Carey found it common in the hedges. The young shoots are round and densely clothed with light brown, soft, short pubescence. *Leaves* opposite, short-petioled, cordate, entire, somewhat

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pointed, with short hairs on the upper surface, and the under one downy, from two to eight inches long, and from one to five broad; those accompanying the ramifications of the inflorescence are very small, more pubescent and coloured, in fact they may be called bractes. *Stipules* a connecting ridge only, extending through the division of the inflorescense. *Panicles* axillary, large, downy, generally composed of a few opposite pairs of branches, bearing single, opposite, long-peduncled involucred umbellets of small white flowers. *Bractes* no other than the floral leaves above-mentioned. *Involucre* three leaved, from five to ten-flowered; *leaflets* spreading, sessile, oblong, veined, often emarginate or retuse, tomentose, much longer than the flowers; those on the inside of the base next to the flowers hairy like the calyx. *Perianth* proper, campanulate, five-toothed, both sides clothed with long soft white hair. *Corol* one-petalled; *tube* cylindric, longer than the calyx. *Border* of two unequal lips; *one*, viz. the interior one in all the exterior flowers in the same umbellet, is divided into three short, rounded segments; the *other*, or exterior one, as long as the tube, and deeply divided into two obovate segments. *Filaments* four, more than twice the length of the corol, variously contorted; the pair next the long lip shorter. *Anthers* two-lobed. *Germ* superior, oblong, two-celled, each cell half divided by two incomplete partitions, which project from the centre of the complete partition, containing four seeds attached to the upper end of the angle formed by the partitions. *Style* as long as the stamina. *Stigma* bidentate.

3. R. *tomentosa*. *R.*

*Involucre* three-leaved, from six to nine-flowered. *Stigma* entire. *Leaves* opposite, cordate.

An immense, climbing shrub, or I may say tree, a native of forests of Chittagong, where it blossoms in March.

*Bark* of the large trunk, and old ligneous branches, scabrous and ash-coloured, of the young shoots tomentose. *Leaves* opposite, short-petioled, cordate, entire, more or less villous,

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according to age, from four to six inches long, and from three to four broad. *Floral leaves* small, and very downy. *Panicles* axillary and terminal, composed of many ascending, opposite pairs of tomentose branches, giving support to the opposite, single, peduncled umbellets of small, white flowers. *Bractes* from oblong to cordate, very downy, solitary, sessile, one at the base of each peduncle. *Involucre* three-leaved, from six to nine-flowered; *leaflets* elliptic, downy, pink-coloured, some few of them emarginate, above an inch long, and above half an inch broad. *Perianth* tubular, very hairy, five-toothed. *Corol; tube* the length of the calyx; *border* bilabiate; the *exterior lip* very long, and bifid; the *under* or rather *interior* one of three oval, equal, sessile segments. *Filaments* didynamous, very long, much exceeding the exterior lip of the corol, variously bent. *Anthers* two-lobed. *Germ* sub-turbinate, &c. &c. exactly as in the former species. *Pericarpium* not seen.

A native of Coromandel, where it flowers in the cold season.

*CLERODENDRUM. Schreb. gen. N.* 1057.

*Calyx* five-cleft. *Corol* irregular, funnel-shaped. *Stamina* very long. *Germ* superior, seems four-celled. *Cells* one-seeded; *attachment* sub-interior. *Berry* or *capsule* dry, four-lobed, with a single seed in each. *Embryo* erect, without perisperm.

1. C. *phlomoides. Willd.* iii. 306.

Arboreous. *Leaves* ovate-cordate, scollop-dentate, downy. *Panicles* terminal; *berries* turbinate, dry.

Volkameria multiflora. *Burm. Ind.* 137. *t.* 45. *f.* 1.

Telaki of the Telingas.

Of this small tree, there are two varieties, one, the common one, with white flowers; the other with red, this variety is rare, a native of the mountainous parts of the coast of Coromandel, and differs from the white variety in the colour of



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the flowers only, consequently, the same description serves for both.

*Trunk* from six to ten feet high, and as thick as a man's thigh, near houses it is so much cut for firewood, &c. so that the size cannot be determined by such plants. *Bark* light ash-colour. *Leaves* opposite, petioled, broad-cordate, scollop-dentate, downy, one or two inches each way. *Petioles* round, downy, half the length of the leaves. *Flowers* numerous, from the extremities and exterior axills, forming a large leafy panicle; *peduncles* generally three-parted. *Bractes* oval, petioled.

2. C. *inerme. Gært. Sem.* i. *t.* 75.

Shrubby, scandent. *Leaves* oval, entire, smooth. *Peduncles* three-flowered. *Berries* dry, turbinal, four-partible.

Volkameria inermis. *Willd.* iii. 303.

Nir-notsjil. *Rheed. Mal.* v. *t.* 49.

Jasminum littoreum. *Rumph. Amb.* v. *t.* 46.

*Beng.* Bun-jumat.

A large, ramous, often scandent shrub, delighting in a salt, sandy soil, near the sea. Flowering time, the cold season chiefly.

*Leaves* opposite, or nearly so, sometimes three-fold, short-petioled, oval, smooth, entire, fleshy; both sides dotted with numerous minute, dark green dots; from one to two inches long. *Stipules* none. *Peduncles* axillary, solitary, generally three-flowered. *Calyx* small, five-toothed. *Corol; tube* widening a little near the apex; *border* of five, distinct, equi-distant, roundish segments. *Fruit* dry, pear-shaped, four-partible. *Seeds* solitary.

*VOLKAMERIA. Schreb. gen. N.* 1056.

*Calyx* five-cleft. *Corol* one-petalled, with unilateral segments, opposite to the long curved stamina. *Germ* superior, seems four-celled; *cells* one-seeded; *attachment* sub-interior.

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*Berry* (or *capsule*) four-lobed, four-partible, with a single seed in each. *Embryo* erect; without perisperm.

1. V. *infortunata. Roxb.*

Shrubby. *Leaves* ovate-cordate, serrulate, downy. *Panicles* terminal, brachiate. *Berry* enclosed in the enlarged coloured calyx, four-lobed.

Clerodendrum foliatum, &c. *Burm. Zeyl.* 66. *t.* 29. *infortunatum. Willd.* iii. 386.

Peragu. *Rheed. Mal.* ii. *t.* 25.

Bhanti, or Bhantaca, in Sanscrit.

*Hind.* Bhant.

A very pretty shrub when in flower, and fruit. It is generally found under the shade of large trees, in consequence of birds dropping the seeds there. Flowers in February and March; seed ripens in April.

*Stem* erect, somewhat quadrangular. *Branches* few, opposite, four-sided. *Leaves* opposite, petioled, remote, cordate, slightly serrate, downy, very various in size, but in general large, in old plants much narrower, even ovate lanceolate. *Panicles* terminal, large, cross-armed, coloured. *Flowers* numerous, pretty large, white with a small tinge of red. *Calyx* increasing with the fruit, of a bright red: *divisions* lanceolate, waved. *Corol*, its five divisions are ranged in a semicircular form on the upper side. *Stamens* nearly equal, ascending until fecundation is over, then declining. *Style* declined, until fecundation is over, then ascending. *Berry* a little depressed, somewhat four lobed, lodged in the calyx, the divisions of which are now enlarged, of a conic shape, red and leathery, of the size of a small black cherry; when ripe, of the same smooth, shining, black colour. *Seeds* four in the complete berries, but it is seldom they all come to perfection, convex and wrinkled on the outside. *Embryo* erect, without perisperm.



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2. V. *Buchanani. Roxb.*

Shrubby, erect. *Leaves* cordate, entire, downy. *Corymbs* terminal. *Calyx* shorter than the succulent berries, and reflected back from them.

A shrub, received from Dr. Buchanan at Luckipore where the plant is found wild. The same plant was afterwards received from the Moluccas. Flowering time the close of the rains; the seed ripens in January.

*Stem* erect, with few expanding, opposite branches. *Young shoots* downy, and somewhat four-sided. *Leaves* opposite, petioled, cordate, entire, downy on both sides, from four to six inches long, and from three to four broad. *Corymbs* terminal, bearing many, pretty large, deep scarlet coloured flowers. *Peduncles* and *pedicels* villous and coloured. *Bractes* small, coloured, and villous. *Calyx* five-cleft, small and pretty smooth. *Corol; tube* slender, five or six times longer than the calyx, (this mark alone distinguishes it from *Volkameria infortunata.*) *Border* of five, equal, erect, unilateral divisions. *Berry* four-lobed, four-seeded, sitting on the reflexed, bright red coloured, permanent calyx; when ripe of a dull bluish purple colour.

3. V. *Kæmpferi. Willd.* iii. 385. *Banks's icon. Kæmpf. t.* 50.

Shrubby. *Leaves* long-petioled, round-cordate, sub-entire, margins a little waved, scaly underneath. *Panicles* terminal, brachiate, broad-ovate, coloured. *Calyx* globular. *Berries* succulent.

A large, ramous, erect shrub, now common in gardens about Calcutta; it was orginally introduced from China. Is in flower during the hot and rainy season.

*Root* branchy. *Stem* scarcely any, but many erect branches, which are woody, and columnar below, young parts obtusely four-sided, and a little scabrous. *Leaves* opposite, petioled, round-cordate; *lobes* large and rounded; *margins* entire, a little downy, the under side is covered with small concave scales;

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from six to twelve inches each way; *Petioles* round, from four to eight inches long. *Stipules* no other than a hairy ring round the branchlet, at the insertion of the leaves. *Panicles* terminal, large, cross-armed, every part thereof of a deep, bright, beautiful scarlet colour, even the floral leaves of the lower ramifications. *Bractes* solitary, linear, recurved. *Flowers* numerous, middle-sized, scarlet coloured. *Calyx* at all times scarlet coloured. *Corol*, divisions of the border shorter than the tube, reflexed in a semi-circle over the upper side. *Stamens* ascending. *Stigma* bifid; *segments* acute.

4. V. *dentata. R.*

Shrubby. *Leaves* round-cordate, acutely-dentate, acute; *lobes* rounded, and so large as to overlap each other. *Panicles* terminal, brachiate, coloured.

An erect, very elegant shrub, of three or four feet in height, a native of the Silhet district; flowering time the hot and rainy season; it has not yet ripened seed in the Botanic garden, where it grows luxuriantly, and is very ornamental when in flower. It differs from V. *Kæmpfera* and *Buchanani* in the leaves being dentate, and from *urticifolia* in being a permanent shrub; besides in that species the leaves are much deeper cut round the margin, and the lobes never so large as even to meet. In all the four, the flowers are nearly alike in size, structure and colour, viz. a very bright deep scarlet.

5. V. *urticifolia. Roxb.*

Herbaceous. *Leaves* broad-cordate, acuminate, grossly and acutely dentate. *Panicles* terminal, coloured.

An elegant, middling-sized species, a native of Pegue, from thence introduced into the Botanic garden at Calcutta by the Rev. F. Carey, where it blossoms in August, September and October.

*Stems* herbaceous in our young plants, simple, erect, becoming somewhat ligneous towards the base, and thinly

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covered with rough ash-coloured bark; tender shoots with four obtuse angles and grooved sides, covered with villous green bark; whole height from three to four feet. *Leaves* opposite, the inferior one very long-petioled; the superior, or floral ones sub-sessile; all are broad-cordate, with the acuminate margins grossly and acutely serrate-dentate, and the *surfaces* rather rough, the superior one with short bristles, and the inferior with little peltate glandular scales; *length* and *breadth* from five to ten inches. *Stipules* none, but a belt of hairs between the insertion of the petioles. *Panicles* terminal, solitary, large, and broad; composed of expanding, opposite, several times dichotomous, highly coloured, (scarlet,) villous, many-flowered ramifications. *Bractes* small, subulate, coloured. *Calyx* sub-cylindric, small for a *volkameria*, five-parted. *Segments* lanceolate, villous. *Corol* one-petalled; *tube* twice the length of the calyx, sub-cylindric; *border* of five, sub-secund, linear-oblong, obtuse, concave segments; colour of the whole scarlet. *Filaments* nearly equal, twice the length of the corol, coloured, smooth, on the first day incurved, on the second recurved. *Anthers* brown, incumbent. *Germ* oval, somewhat four-lobed, seemingly four-celled, with one ovulum in each, but on a minute inspection there are found two, opposite, parietal receptacles, which meet so exactly in the centre, as to appear a complete partition, each of these divide into two, recurved, secund, rather incurved. *Stigma* of two subulate acute lobes.

6. V. *obovata. Roxb.*

*Leaves* obovate, entire, coriaceous, downy underneath. *Panicle* terminal, decussate, downy, the extreme ramifications, lengthened, secund spikes. *Calyx* obscurely five-toothed.

A native of the Moluccas.

7. V. *serrata. Willd.* iii. 384.

Shrubby. *Leaves* sub sessile, opposite, and tern, lanceolate, serrate, smooth. *Panicle* terminal, oblong, decussate.

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Found in Mysore by Dr. Buchanan, who sent the seeds to the Botanic garden at Calcutta, where the plants blossom during the rains.

*Trunk* erect, stout, ligneous. *Branches* erect, decussate, or tern; *young shoots* smooth, four-sided. *Leaves* opposite, or tern, sub-sessile, broad-lanceolate, serrate, smooth on both sides; from four to eight inches long, and from one to three broad. *Panicles* terminal, ramifications decussate, villous, two-forked. *Bractes* lanceolate, villous. *Flowers* numerous, large, two pairs of lateral segments, pale blue; the lower one deep blue. *Calyx* obscurely five-dentate. *Corol; tube* short, deeply divided on the upper side, incurved. *Border* of five, nearly equal, expanding divisions, placed on the under side. *Filaments* longer than the corol, erect, with their extremities beautifully recurved. *Anthers* oval, *Style* as long as the stamens. *Stigma* of one long (the under), and one shorter lobe. *Berry* with from one to four lobes, smooth, succulent, when ripe of a shining black. *Seeds* one in each lobe of the berry, obovate. *Corol, tube* the length of the calyx, villous. *Border* of five, unequal, segments, placed on the under side, the two lateral pairs oblong, of a very pale blue, the lower one much larger, cuneate-cordate, and of a much deeper colour. *Filaments* swelled and villous at the base, inserted on the mouth of the tube, and rising erect through the vacant space on its upper side, towards the apex beautifully recurvate. *Anthers* brown, two-lobed. *Germ* roundish, having its base surrounded by a yellow nectarial ring, four-celled, with one ovulum in each, attached to the upper and exterior margins of the partitions. *Style* the length of the stamina. *Stigma* two-parted. *Capsule* nearly round, of the size of a pea, somewhat four-lobed, hairy; when ripe dry, and then falling spontaneously into four equal portions. *Seed* solitary, obliquely oblong. *Integument* single. *Perisperm* none. *Embryo* erect. *Cotyledons* linear-oblong, thick, fleshy and white. *Radicle* oval, inferior.

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8. V. *farinosa. R.*

Shrubby twigs mealy. *Leaves* opposite, petioled, oblong, serrate. *Panicles* terminal, linear-oblong, leafy. A very stout shrub, or small tree, a native of Silhet, where it is called *Taleuser*. Flowering time the rainy season. It approaches nearest to *serrata* of any species known to me, but differs sufficiently on account of the perfect smoothness of the latter, which has the leaves as often tern as opposite; in *farinosa* petioled, always opposite.

9. V. *nereifolia. R.*

Shrubby. *Leaves* tern, linear-lanceolar. *Peduncles* axillary, three-flowered.

A shrubby species, found indigenous on the Island of Mascal, on the coast of Chittagong; where it blossoms about the close of the rains, and the seeds ripen in February.

*Stem* short, but straight, stout and ligneous, soon dividing into many straight, nearly erect branches and branchlets; *bark* smooth, and of a light ash-colour and marked with light-coloured, small, elevated specks. *Leaves* tern, rarely opposite, linear-lanceolar, entire, acute, smooth, about three inches long, and very generally under half an inch in breadth. *Petioles* short, and inserted on permanent elevated leaves. *Peduncles* axillary, much shorter than the leaves, generally three-flowered. *Bractes* opposite, ensiform. *Calyx* campanulate, mouth evenly five-toothed, permanent. *Corol* with a rather short, slender, curved tube, and unilateral border, composed of five equal, oval, entire segments. *Stamina* twice the length of the corol, incurved or recurved, according to the length of time the flower has been expanded. *Germ* superior, four-celled, with one ovulum in each. *Style* length of the stamina. *Stigma* bidentate. *Capsule*, (*Berry*, Gært.) broad-turbinate, four-grooved, size of a nutmeg, when ripe dry, and spontaneously dividing first into two and afterwards into four parts. *Cortex* pretty smooth,

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dark brown. *Pulp* in large quantity, somewhat spongy. *Seed* in each division of the capsule, oblong, tapering towards the base. *Integuments* two, both soft, thin and white. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed, equal. *Plumula* two-lobed. *Radicle* inferior, the whole much like *Clerodendrum inerme*. *Gært.* i. *t.* 57.

### *HASTINGIA. König's Mss.*

*Calyx* coloured, much expanded, almost entire. *Corol* with a long, curved tube, and unequally divided border. *Germ* superior, seems four-celled; *cells* one-seeded; *attachment* sub-interior. *Capsule* four-lobed, four-partible; *lobes* one-seeded. *Embryo* erect, without perisperm.

1. H. *coccinea. Kön. Mss. Smith's Exotic Botany*, 100.

*Leaves* cordate, serrate. *Panicles* terminal.

Holmskioldia *sanguinea. Willd.* iii. 360.

This most elegant plant was brought originally from China, though a native of the interior parts of Bengal also. At the Botanic garden it grows to be a small tree if trained up with single stem, but if left alone, the branches spread far every way from the base of the stem close upon the earth, and strike root. The *bark* is ash-coloured and tolerably smooth. Flowering time the cold season, at which period scarcely any plant can exceed it in beauty. It grows readily from cuttings.

*Branches* very numerous, brachiate, while young somewhat four-sided, and a little downy. *Leaves* opposite, petioled, cordate, serrate, long, pointed, a little downy, from three to four inches long. *Petioles* one fourth the length of the leaves, downy. *Stipules* none. *Panicles* on compound racemes, terminal, brachiate. *Peduncles* and *pedicels* a little hairy. *Bractes*, the larger ones petioled, cordate, the smaller lanceolate. *Flowers* numerous, pretty large, of a most beautiful scarlet co-



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lour, slightly tinged with orange, inodorous. *Calyx* one-leaved, very large, gradually widening into a most ample bell, with a slightly five-lobed border, coloured like the corol, permanent. *Corol* one-petalled, irregular. *Tube* longer than the *calyx*, projecting with a slight curvature downward, compressed laterally, widening gradually to the mouth; on the inside a little downy. *Border* small, five-parted; the under division larger. *Stamens* from the middle of the tube, and projecting a little beyond it, declining a little, somewhat downy. *Anthers* oval. *Germ* superior, four-lobed; *lobes* one-celled, one-seeded, attached to the partition a little above its middle. *Style* declinate with the stamens, and of the same length. *Stigma* acute, slightly two-parted. *Capsule* four-lobed, four-partible, each lobe obliquely turbinate, clavate, rugose, of the size of a small lentil, one-celled, one-valved, of a thick, soft, spongy texture, and dark brownish black colour. *Seed* conform to the lobe of the capsule. *Integument* single, from every examination I can give it, pretty thick, white, soft, and tough. *Perisperm* none. *Embryo* erect, amygdaline. *Cotyledons* two, oval, thick. *Plumula* small, semilunar. *Radicle* oval, inferior.

2. H. *scandens. R.*

Shrubby, scandent. *Leaves* cordate, serrate, acuminate. *Flowers* axillary.

Daudmaree, the vernacular name in Silhet, where it is found wild in the forests; it blossoms during the cool months of December, and January. I am not very clear whether it be any thing more than H. *coccinea* in its wild state.

*SIPHONANTHUS. Schreb. gen. N.* 165.

*Calyx* five-parted. *Corol* one-petalled, with a very long slender tube. *Germ* superior, seems four-celled; *cells* one-seeded; *attachment* sub-interior. *Berry* four-lobed; *lobes* one-seeded. *Embryo* erect, without perisperm.

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1. S. *hastata. R.*

*Leaves* opposite, hastate, downy.

A large shrub or small tree, a native of Silhet, where it is called *Hattee-kana* (Elephant's ear,) from the shape of the leaves. Flowers in April and May, and the seed ripens in June and July.

*Young shoots* villous, somewhat four-cornered. *Leaves* opposite, petioled, hastate, lobate, downy, particularly underneath, about six inches long. *Petioles* nearly as long as the leaves, downy and channelled. *Stipules* none. *Panicles* terminal, corymbiform, decussate, villous. *Bractes* like the leaves, but small, and diminishing fast toward the top, or extreme divisions of the panicle. *Calyx* campanulate, five-cleft. *Segments* sub-lanceolate, permanent and remaining coloured. *Corol* with a long, slender, recurved tube. *Border* of five, nearly equal, spreading, oblong segments. *Filaments;* two pairs, inserted into the tube of the corol a little within its mouth, long, coloured, smooth, various in their direction according to the length of time the flower has been open. *Anthers* incumbent. *Germ* ovate, four-cornered, seemingly four-celled, with one ovulum in each lobe, attached to the concave side of the wings of the parietal fungiform, receptacle, meeting in the centre, but not uniting, hence seemingly four-celled. *Style* the length of the corol. *Stigma* bifid; *lobes* acute, spreading. *Berries* shorter than the calyx, four-lobed, one, two or three of the lobes abortive, the fertile ones obovate, smooth, glossy, deep purple, and succulent, one-celled. *Seed* solitary. *Perisperm* none. *Cotyledons* obovate, fleshy. *Radicle* roundish, inferior.

2. S. *indica. Lamarck. Encycl. t.* 79. *f.* 1. 1606.

Shrubby, straight. *Leaves* verticelled, lanceolate. *Panicles* terminal.

Brahmunee, Brahmunuyushtika, &c. Sanscrit names.

*Beng.* Brahman-patta, or Bamun hattee.

Siphonanthus *indica. Linn.*



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Ovieda *mitis. sp. pl. ed. Willd.* iii. 382.

Found wild from Orissa northward; where it grows to be a tall, straight shrub. Flowering time the hot season, and again in October; the seed ripens in the cool season.

*Stem* erect, straight, simple, or with very few, straight branches, more or less piped, according to the age of the plant; *bark* smooth, greenish; *young shoots* smooth, of a shining green, with a double groove or furrow to each leaf of the verticel, and piped in the old woody parts; height various. In some parts of Bengal they are so long as to serve for rafters to cottages, and various other uses. *Leaves* verticelled, generally from three to five-fold, short-petioled, horizontal, lanceolate, entire, waved, above smooth, of a deep, shining green, below paler, from six to nine inches long. *Floral leaves* alternate and smooth. *Stipules* none, but in their place some short hairs. *Fascicles* from the axills of the exterior, alternate leaves, peduncled, in general solitary, erect, generally three-cleft; the whole forming a large elegant panicle. *Peduncles* and *pedicels* roundish, smooth, coloured. *Bractes* lanceolate, size various. *Flowers*, when they first open, white, gradually changing to cream colour. *Calyx* beneath, campanulate. *Corol; tube* exceedingly long, slender, bowing. *Border* five-parted; *divisions* oblong, nearly equal, reflected; the lower two more distant. *Filaments* four, inserted within the mouth of the tube, projecting in a double curve for some time after the flower first expands, afterwards they become revolute. *Anthers* incumbent, &c. according to the position of the filaments, base two-parted. *Germ* and contents as in S. *hastata*, four-lobed. *Style* longer than the stamens, at first projecting, or recurved, after impregnation ascending, when the stamens become revolute. *Stigma* acute, two-parted. *Berries* from one to four, conjoined, sitting on the enlarged, coloured calyx, singly the size of a pea, when ripe, of a dark bluish colour. *Seeds* one in each lobe of the berry; it seldom happens that all the four berries come to perfection. *Embryo* as in S. *hastata.*

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*VITEX. Schreb. gen. N.* 1060.

*Calyx* campanulate, five-toothed. *Corol* ringent. *Anthers* twin. *Germ* superior, generally two-celled; *cells* two-seeded; *attachment* central. *Drupe* with a four-celled nut. *Embryo* erect, without perisperm.

1. V. *trifolia. Willd.* iii. 392.

Sub-arboreous. *Leaves* ternate; *leaflets* all sessile, obovate, oblong, hoary underneath. *Panicles* terminal, with brachiate, dichotomous ramifications.

*Cara-nosi. Rheed. Mal.* ii. *t.* 10.

Lagondium vulgare. *Rumph. Amb.* ii. *t.* 10.

A small tree, or large shrub, a native of various parts of India, and its Islands. The leaves of this plant are a powerful discutient, and by the Malays employed to remove the *boss.* The following is their recipe, furnished, by W. Ewer Esq. The leaves are given in decoction, and infusion, and formed into a cataplasm, which is applied to the enlarged spleen. In very obstinate cases it becomes necessary to have recourse to gentle mercurials.

*Young shoots* round and villous. *Leaves* opposite, ternate. *Leaflets* all sessile, ovate, oblong, entire, hoary underneath; the pair from one to two inches long, and the terminal one much longer. *Petioles* about an inch long, and hoary. *Stipules* none. *Panicles* terminal, linear-oblong, composed of brachiate and dichotomous ramifications, every part hoary. *Flowers* small, of a lively light blue purple. *Bractes* minute. *Calyx* campanulate, hoary; *mouth* slightly five-toothed. *Corol* with the *lower lip* longer and undivided; the *upper lip* four-lobed. *Stamina* as long as the corol. *Anthers* twin. *Germ* round, two-celled, with ovula in each attached to the two angles of the septal receptacle. *Style* as long as the corol. *Stigma* of two filiform spreading lobes. *Drupe* round, smooth, when ripe black, size of a small pea, one-celled. *Nut* conform to the drupe, four-celled, nearly all fer-

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tile. *Seed* solitary. *Perisperm* when the seeds are quite ripe none. *Embryo* erect. *Cotyledons* obovate-oblong. *Radicle* oval, inferior.

2. V. *Negunda. Willd.* iii. 393.

Arboreous. *Leaves* ternate, and quinate. *Leaflets* entire, lanceolate; the lower two sessile. *Panicles* terminal, long-pyramidal, with cross-armed, two-forked ramifications.

Bem-nosi. *Rheed. Mal.* ii. *t.* 12.

Lagondium litoreum. *Rumph. Amb.* iv. *t.* 19.

Sindooka in Sanscrit. See *Asiat. Res. vol.* iv. *p.* 292.

Also Sindoowara, Indrasoorusa, Nirgoondi, Indranika. *Beng.* and *Hind.* Nisinda.

An elegant, small tree, though generally found in the state of a large shrub; delights in a rich, moist soil, yet it grows almost every where. Flowers all the year round.

*Trunk* irregular, often as thick as a man's thigh or more. *Branches* rather thin, opposite; *young shoots* downy, slightly four-sided. *Leaves* opposite, petioled, ternate and quinate. *Leaflets*, the exterior one or three, petioled; the lower two sessile; all are lanceolate, entire, soft; below of a very pale whitish green; from two to four inches long, and less than one broad. *Panicles* terminal, oblong, tapering to a point, erect; *rachis* straight, four-sided; ramifications decussated, generally three-forked; or two-forked with sessile flowers in the cleft. *Flowers* small, numerous, a most beautiful bluish purple. *Calyx* permanent, closely embrace the bottom of the berry. *Corol; lower lip* large, entire; *upper lip* shorter, four-parted.

A decoction of the aromatic leaves helps to form the warm bath for women after delivery; bruised, they are applied to the temples for the head-ache; pillows stuffed with them are put under the head to remove a catarrh, and the head-ache attending it.

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3. V. *paniculata. Lamarck Encycl.* ii. 606.

Arboreous. *Leaves* digitate, quinate; *leaflets* ovate-lanceolate, entire; the exterior one petiolate, the two inferior ones small, and sessile; smooth above, hoary underneath. *Panicles* terminal.

A native of the Moluccas. I doubt whether it be any thing more than a broad-leaved, luxuriant variety of *Negunda. Rumphius, 19th plate of the 4th vol. of his Herbarium Amboinense,* is a bad representation of this plant, though no doubt intended for it.

4. V. *altissima. Linn. Suppl.* 294.

Arboreous. *Leaves* ternate; *leaflets* lanceolate, entire, acuminate. *Panicles* terminal, composed of opposite, verticelled, simple ramifications.

This, the most stately tree of the genus which I have yet met with, is a native of the mountainous forests of Coromandel. In Dr. Anderson's garden near Madras, it flowers in July and August. The same has since been found in the eastern parts of Bengal, where it flowers in June.

*Trunk* erect, of very considerable magnitude, and covered with smooth greenish gray bark. *Branches* numerous, spreading. *Leaves* opposite, ternate. *Leaflets* sessile, entire, acute, somewhat downy, with the upper surface of a deep green, and the lower one pale, from three to six inches long, and from one to two broad. *Petioles* common, somewhat channelled, and though long, they are shorter than the leaflets. *Panicles* terminal, composed of a few long, simple, opposite, pairs of sub-verticelled, downy spikes. At a more advanced age, what appeared verticels while young, become two opposite, short, bifid, or trifid secund spikes. *Flowers* numerous, small, collected, into short-peduncled, opposite fascicles, which appear like verticels. *Bractes* lanceolate, concave, downy. *Calyx* downy, the segments rather unequal. *Corol,* &c. as in the family. *Germ* ovate, four-celled, with one ovulum in each, attached to the partition. *Style* ful-

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ly as long as the corol. *Stigma* bifid. *Drupe* round, of the size of a pea, smooth, succulent, black. *Nut* round, hard, four-celled. *Seeds* solitary. *Perisperm* none. *Embryo* erect.

5. V. *alata. R.*

Arboreous. *Leaves* ternate; *leaflets* lanceolate. *Petioles* winged. *Panicles* axillary.

Mail eloa. *Rheed. Mal.* v. *t.* 1.

A native of Chittagong, where it grows to be a large tree. From thence it was introduced by Dr. Buchanan into the Botanic garden at Culcutta, where it blossoms in the month of April.

*Trunk* straight, decorated with numerous, spreading and ascending branches, whole height of trees ten years old, about thirty feet. *Bark* smooth, of a dark, brownish, ash-colour. *Leaves* opposite, ternate. *Leaflets* lanceolate, smooth, entire, about six inches long. *Petioles* winged, particularly while the trees are young, about three or four inches long. *Panicles* axillary, solitary, erect, brachiate, with ramifications dichotomous, and a sessile flower in each division. *Flowers* numerous, pale yellow, tinged with very little blue. *Calyx* campanulate. *Border* unequally five-toothed. *Corol*, the middle lobe of the *upper lip* large, in proportion to its lateral lobes; the *under lip* two-parted, and small. *Anthers* twin, and of a bluish colour. *Berry* round, smooth, pulpy, when ripe purple, and the size of a marrow-fat pea. *Nut* turbinate, furrowed, four-celled, with a single seed in each.

6. V. *incisa. Willd.* iii. 392.

Shrubby. *Leaves* ternate and quinate; *leaflets* broad-lanceolate, gashed, of a soft fine texture, all are more or less petioled. *Panicles* terminal.

V. *Negundo. Curt. Mag.* 364.

V. *Chinensis of the Banksian Herbarium*, seems to be the same.

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A native of China, from thence Mr. William Kerr sent seed to the Botanic garden at Calcutta, where the plants thrive luxuriantly, and blossom when under one year old, and when less than a foot high. In six years they seem to have attained their full size, and are therefore large, ramous shrubs, of from six to eight feet in height.

*Stem* short, ligneous. *Branches* numerous, forming a large, ever-green bush. *Leaves* opposite, long-petioled, ternate, and quinate. *Leaflets* oblong, gashed, acute, smooth on both sides. *Panicles* terminal, from two to five inches long. *Flowers* numerous, small, white. *Lower segment* of the border of the corol much larger than either of the other four. *Drupe* the size of a grain of black pepper, with a four-celled nut.

8. V. *arborea. R.*

*Leaves* from ternate to quinate; *leaflets* sessile, oval. *Panicles* contracted.

*Teling.* Boosi.

A native of the mountainous parts of the Circars, Chittagong, &c. where it grows to be a very large tree. Flowering time, the hot season; the seeds ripen during the rains.

*Trunk* straight, high, and of a large size. *Bark* ash-coloured, cracked. *Heads* spreading and shady, but small in proportion to the size of the trunk. *Leaves* opposite, petioled, ternate, and digitate-quinate. *Leaflets* sessile, from broad-lanceolate to oval, sometimes obtuse, sometimes pointed, entire, veins many, running parallel, above pretty smooth, below downy; when there are five, exterior one from one to three inches broad, and from three to six inches long, the lower pair considerably smaller. *Petioles* the length of the inferior leaflets, channelled, downy. *Panicles* terminal, contracted, branchy; *branches* opposite, decussated. *Peduncles* and *pedicels* four-sided, villous. *Flowers* numerous, small, blue. *Bractes* oval, reflexed, downy, one below each ramification. *Calyx* campanulate, five-toothed, permanent. *Corol; tube*



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somewhat gibbous, rather longer than the calyx, inside hairy at the bottom; throat compressed laterally; *border* two-lipped; the *upper lip* erect, two-cleft; the *under lip* reflexed, three-cleft, having the middle division largest, concave, and of a deep blue colour. *Filaments* twice the length of the tube, subulate. *Anthers*, split from the bottom up. *Style*, length of the filaments. *Drupe*, of the size and appearance of a black currant, smooth, succulent. *Nut* turbinate, very hard, four-celled. *Seed* solitary, obovate-oblong. *Integuments* two, both thin, soft, and rather succulent. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed. *Radicle* oval, inferior.

The wood of this tree when old is of a chocolate colour, exceedingly hard and durable, which renders it useful for various purposes.

9. V. *Leucoxylon. Willd.* iii. 392.

*Leaves* digitate, quinate; *leaflets* petiolate, oblong, very generally entire, both sides smooth. *Panicles* axillary, dichotomous.

Kariil. *Rheed. Mal.* iv. *t.* 36.

A native of Ceylon, Coromandel, and the mountains of Chittagong, &c. Flowering time the month of April.

*Trunk* laterally straight, and in its native mountains growing to be a tree of very considerable size. *Bark* soft, spongy and cracked on the outside. *Branches* rather scarce and spreading. *Young shoots* round and smooth. *Leaves* opposite, long-petioled, digitate, quinate, rarely ternate; *leaflets* petioled, oblong, generally entire, rather obtuse-pointed, smooth and polished, from two to six inches long, and from one to three broad. *Petioles* nearly as long the leaflets, round and smooth. *Stipules* none. *Panicles* axillary, solitary, long-peduncled, throughout dichotomous, with a sessile flower in the forks, drooping, ramifications tending to be angular, and most slightly villous. *Flowers* numerous, fragrant, pretty large, of a whitish straw colour, with the centre of the lower

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lip densely clothed with violet coloured hairs. *Bractes* very minute, and caducous. *Calyx* five-toothed. *Corol* with an unequal, five-cleft border; lower division large, round and curled. *Filaments* purple, protruded in a recurved manner. *Anthers* purple, two-lobed. *Drupe* oval, smooth, of a shining black. *Pulp* very soft, and in large quantity, of a dirty black colour. *Nut* oblong, compressed, somewhat furrowed, four-celled, it is rare however that all are fertile. *Seed* lanceolate, the upper end obtuse. *Integuments* single, white, and spongy. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed, long obovate, of a tender, oily texture, pale white. *Panicle* conic, inferior.

10. V. *heterophylla. R.*

*Leaves* long-petioled, ternate and quinate; *leaflets* all long-petioled, broad-lanceolate, entire, acuminate, smooth.

A tall, slow-growing timber tree, a native of the Tippera forests; it has been fourteen years in the Botanic garden at Calcutta, and is thirty feet high without having blossomed.

11. V. *Saligna. R.*

*Leaves* ternate and quinate; *leaflets* petioled, lanceolar, entire, smooth. *Panicles* axillary, dichotomous.

A tree of considerable size; a native of the forests in the interior parts of Coromandel, from thence introduced by Dr. B. Heyne into the Botanic garden where it blossoms in April and May.

*PREMNA. Schreb. gen. N.* 1025.

*Calyx* from three to five-toothed. *Corol* irregular, four or five-cleft, woolly. *Anthers* twin. *Germ* superior, four-celled; *cell* one-seeded; *attachment* interior. *Stigma* two-cleft. *Drupe* with a four-celled nut. *Seed* solitary. *Embryo* erect, without perisperm.



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1. P. *latifolia. Roxb.*

Arboreous. *Leaves* round-cordate, entire, smooth. *Corymbs* axillary, and terminal. *Throat* of the corol woolly.

*Teling.* Pedda-nella-kura.

It is a native of most parts of the coast of Coromandel, though by no means common; grows to be a small tree. Flowers during the hot season.

*Trunk* erect. *Bark* ash-coloured, pretty smooth. *Branches* numerous, spreading. *Leaves* opposite, petioled, cordate or oval, entire, pointed or obtuse, a little downy, in general two and a half inches each way. *Petioles* round, generally about an inch long. *Corymbs* compound, terminal, or from the exterior axills, divided by threes. *Bractes* minute, falling. *Flowers* numerous, small, of a dirty yellow. *Calyx* campanulate, five-toothed, permanent. *Corol*, throat woolly; the *upper lip* three-cleft; the *under* one emarginate. *Anthers* bluish. *Style* longer than the corol. *Drupe*, the size of a pea, twin, juicy, smooth, when ripe black. *Nut* wrinkled, four-celled, all the four seeds seldom ripen.

The wood of this tree is white, firm, and used for various economical purposes. The leaves have a pretty strong, though not disagreeable smell, and are much used in curries by the natives.

2. P. *tomentosa. Willd.* iii. *p.* 314.

Arboreous. *Leaves* ovate-cordate, pointed, entire, very downy. *Panicles* terminal, corymbiform.

*Teling.* Naooroo.

A tree, a native of the mountainous parts of the Circars. Flowers during the cold season.

*Bark*, the exterior membranous, cracking and peeling off like that of the birch tree, of a light gray colour; *young shoots* covered with a soft gray down. *Leaves* opposite, petioled, cordate, pointed, entire, very downy underneath, and whitish, above light green, from four to five inches long, and about two and a half, or three broad. *Petioles* round, about an inch

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and a half long. *Panicles* middle-sized, terminal, erect, downy, somewhat corymbiform, their ramifications scattered. *Bractes* filiform, downy. *Flowers* numerous, small, of a dirty greenish yellow. *Calyx* and *corol* as in the last species. *Anthers* yellow, twin. *Pistillum*, *drupe*, and *nut* as in the other species, in this seldom more than one of the seeds ripen, which makes the most appear to have only one cell.

3. P. *serratifolia. Willd.* iii. 314.

Shrubby. *Leaves* cordate, serrate, acuminate, smooth, lucid, deep green. *Corymbs* terminal.

*Beng.* Bhoot-bhiruvi.

A large shrub, or small ramous tree, common in the woods in Bengal, is in blossom during the rainy months of July and August. The whole plant has a heavy unpleasant smell, nearly the same as in some of the other species of this genus.

*Trunk* short. *Branches* numerous. *Bark* smooth, and dark brown; *young shoots* somewhat villous. *Leaves* opposite, petioled, cordate, serrate on the anterior margins, long, acute-pointed, smooth on both sides, generally from one to six inches long, and from one to three broad. *Stipules* no other than a small connecting ridge. *Corymbs* terminal, or between two tender, terminal branchlets; primary divisions opposite, the last two-forked. *Flowers* minute, very numerous, of a pale greenish white. *Bractes* of the larger ramifications, lanceolate. *Perianth* small, irregularly three-toothed. *Corol* obliquely funnel-shaped. *Border* bilabiate, the superior lip narrow, undivided, and nearly double the length of the other, which is broad, and three-parted. *Anthers* twin.

4. P. *spinosa. Roxb.*

Arboreous, armed. *Leaves* opposite, three or four-fold, oval, entire, smooth on both sides. *Corymbs* terminal.

*Gumira litorea. Rumph. Amb.* iii. *t.* 134.

*Hind.* Ustabunda.

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*Beng.* Goniari.

Cornutioides. *Hor. Zeyl. N.* 416.

A small ramous tree, found in woods near Calcutta. Flowering time, the beginning of the rainy season. The fruit ripens in three months afterwards.

*Thorns* are found on the trunk and larger branches only, large and strong, placed opposite and spreading. *Leaves* generally opposite, though sometimes three, or even four-fold, petioled, oval, entire, obtuse, smooth on both sides; from two to three inches long. *Petioles* short, smooth, slightly channelled. *Stipules* none. *Corymbs* terminal, pedunculed, first ramification cross-armed, the rest two-forked, in branchlets with the leaves three-fold, the first ramifications of the corymbs are also three-fold, &c. *Bractes*, a small one below each ramification. *Flowers* very numerous, small, of a greenish yellow, very hairy, and of an offensive smell. *Calyx* three-cleft. *Corol, tube* thrice as long as the calyx; throat woolly; *upper divisions* of the border twice as long as the upper divisions of the border of the corol. *Calyx* the length of the stamens. *Drupe* globular, black, smooth, the size of a small pea. *Nut* turbinate, rough, four-celled.

5. P. *cordifolia. Roxb.*

Shrubby. *Leaves* cordate and cordate-ovate, entire, smooth, with the upper surface bullate and shining. *Corymbs* terminal, decussate, with ramifications dichotomous.

Folium hircinum. *Rumph. Amb.* iii. *t.* 133. agrees rather better with this species, than with any other I have yet found in India.

A native of Prince of Wales' Island, and from thence introduced into the Botanic garden at Calcutta in 1798, where it thrives and blossoms during the hot months of May and June.

*Trunk* erect; *branches* few, some straight, and free of branchlets as a rattan; others ramulose, and straggling; the height of the plants in this garden, in four years, is from six to

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eight feet. *Bark* of the old woody parts dark brown, of the younger light-brown. *Leaves* opposite, short-petioled, from cordate to cordate-ovate, entire, pointed, bullate, at the same time the upper surface is of a bright, shining, deep green colour, from three to six inches long, and broad in proportion. *Stipules*, no other than a small connecting ridge. *Corymbs* terminal; primary ramifications decussate, then dichotomous; round, villous, and of a very dark brownish olive colour. *Bractes* oblong. *Flowers* very numerous, small, of a pale greenish white. *Calyx* bilabiate. *Corol* bilabiate. *Throat* filled with long, soft, white hairs. *Lips* equal in length; the *upper* one narrow, and entire; the *lower* one, broad and three-lobed. *Stamens* nearly as long as the corol. *Style* considerably longer than the corol. *Drupe* the size of a large pea. *Nut* three or four-celled.

The leaves of this species possess a small degree of fragrance, when bruised, at least to me the smell is not so disagreeable as that of the other species.

6. P. *longifolia. Roxb.*

Arboreous. *Leaves* ovate-oblong, acuminate, entire, smooth. *Corymbs* terminal.

A native of Bengal, where it blossoms during the rainy season.

*Trunk* erect; *branches* opposite. *Bark* smooth and ash-coloured, dark brown, or greenish brown according to age; general height of the tree twenty feet. *Leaves* opposite, petioled, from ovate-oblong to oblong, entire, acuminate, smooth on both sides, from four to ten inches long. *Petioles* channelled, somewhat villous, from two to three inches long. *Stipules* none, except a small, connecting, villous ridge. *Corymbs* terminal, large, and spreading much; the first two or three pairs of divisions brachiate; afterwards dichotomous. *Bractes* minute. *Flowers* numerous, small, white; *upper lip* larger, and two-toothed; the *lower lip* three-toothed. *Calyx* bilabiate. *Corol*; *tube* short; *border* four-parted; *upper division*

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longer, more coloured and reflexed; the *lateral two* expanding, the *lower* broadest and emarginate. *Drupe* globular, of the size of a grain of black pepper, when ripe, smooth, shining black. *Nut* obovate, rugose, four-celled, with one seed in each. This is the only species I have yet met w[illegible], which I can say has any thing like an agreeable smell, this mark alone is sufficient to distinguish it from the other species already described and figured by me; there are, however, as may be observed in the description, many other differences to rest its specific character on.

7. P. *herbacea. R.*

Herbaceous. *Leaves* opposite, obovate, serrate. *Corymbs* terminal and axillary.

*Beng.* Bhooi-Jamb.

Bhoomi-Jambooka, its Sanscrit name.

A native of the interior parts of Bengal. From Dinagepore, Dr. William Carey sent the plant to the Botanic garden, where it blossoms during the months of February and March.

*Root* ligneous, perennial. *Stems* scarcely any, a few leafy fructiferous, annual shoots rise from the roots about the close of the cold season, and when the seeds ripen decay. *Leaves* opposite, short-petioled, obovate, serrate, a little villous on both sides, very various in size. *Corymbs* terminal, and axillary, small, and shorter by far than the leaves. *Flowers* small, of a pale whitish yellow. *Corol* four-cleft; *upper segment* round; *throat* hairy.

8. P. *mucronata. R.*

Arboreous. *Leaves* broad-ovate, tapering at the base, sharply acuminate, entire, slightly villous. *Corymbs* terminal.

A small tree, a native of Silhet, and there called Manoamal. Flowering in April, and the seed ripens in July and August. The wood is said to be remarkably hard and useful. It differs from all the other species known to me, in

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the tapering base of the leaves; the sharp point of the acuminate leaves is also a good mark; for though in P. *scandens* the same mark exists, even in a greater degree, yet this is a small tree; that a scandent shrub.

9. P. *esculenta. R.*

Shrubby. *Leaves* short-petioled, oblong, grossly serrate, acuminate, smooth. *Corymbs* terminal, dense.

A native of Chittagong, where the natives use the leaves in their diet, as well as in medicine. In the Botanic garden it continues in flower and fruit nearly the whole year.

*Stem* short. *Branches* and *branchlets* opposite. *Bark* on the young shoots, smooth, of a clear green. *Leaves* opposite, short-petioled, oblong, broadest a little above the middle, grossly and acutely serrate, acuminate, from four to ten inches long, by from two to five broad. *Stipules* none. *Corymbs* terminal, short-peduncled, broad, and much crowded, with some pairs of opposite, multifid, smooth branches. *Flowers* numerous, small, of a greenish yellow. *Bractes* minute. *Calyx* unequally five-toothed. *Corol* with a short campanulate tube. *Border* four-parted; *upper lobe* broad, obtusely three-toothed, and vaulted over the hairy mouth of the tube, anthers, and stigma; the other three lobes nearly equal, and may be called the lower lip; the base of the middle one thereof is yellow. *Anthers* twin. *Germ* four-celled, with one ovulum in each, attached to the upper part of the partitions. *Style*, length of the stamina. *Stigma* two-toothed. *Drupe* minute, round, smooth, purple. *Nut* turbinate, rugose, four-celled, with a perforation up the centre. *Seeds* solitary, obovate. *Perisperm* none. *Embryo* erect. *Cotyledons* equal, conform to the seed. *Radicle* inferior.

10. P. *integrifolia. Willd.* iii. 314.

Arboreous. *Leaves* elliptic, entire, smooth. *Corymbs* terminal, rather irregular.

Folium hirci. *Rumph. Amb.* iii. *t.* 134.



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Cornutia *corymbosa. Burm. Ind.* 133. *t.* 41. *f.* 1.

Found by Colonel Hardwicke indigenous on the Mauritius, in flower in May and June.

11. P. *scandens. R.*

Shrubby, scandent. *Leaves* from ovate-oblong to cordate, entire, much and very finely acuminate. *Corymbs* terminal, supra-decompound. *Calyx* entire; *throat* of the corol woolly. *Nut* tubercled.

An extensive, powerful, climbing shrub, a native of the forests of Silhet, where it runs over the larger trees. Flowering time the hot season; the seed ripens during the rains.

*Young shoots* more or less villous and somewhat four-cornered. *Leaves* opposite, differing in shape from narrow ovate-oblong to cordate, all perfectly entire, ending in a long sharp, ensiform, or even filiform point, sometimes villous, from four to six inches long, and from one and a half to four broad. *Petioles* about an inch long, generally villous. *Corymbs* terminal; primary divisions decussated, secondary one dichotomous; all villous. *Bractes* subulate. *Flowers* numerous, very small, of a greenish yellow. *Calyx* cup-shaped, entire, smooth. *Corol* with the mouth of the tube very woolly. *Border* of four, equal, oblong, obtuse divisions. *Stamina* longer than the corol. *Germ* roundish, four-celled, with one ovulum in each, attached to the axis. *Style*, the length of the stamina. *Stigma* bifid. *Drupe*, the size of a pea, round, smooth, succulent, black, one-celled. *Nut* conform to the drupe, tubercled, four-celled, generally one or more abortive. *Seed* solitary, obovate. *Integument* single, thin, white. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed. *Radicle* inferior.

*GMELINA. Schreb. gen. N.* 1023.

*Calyx* from four to five-toothed. *Corol* obliquely campanulate; *border* irregularly four-parted. All the anthers two-

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cleft. *Germ* superior, four-celled; *cells* one-seeded; *attachment* sub-superior. *Drupe* with a nut, from one to four-celled. *Embryo* erect, without perisperm.

1. G. *oblongifolia. R.*

Arboreous. *Leaves* opposite, oblong. *Panicles* terminal, brachiate. *Drupes* oblong, lucid. A slow growing, tall timber tree; a native of the eastern parts of Bengal; flowering in March and April; the seed ripens in August and September.

*Trunk*, in trees fourteen years old in the Botanic garden, straight, from twelve to fifteen feet to the branches, and about eighteen inches in circumference. *Bark* ash-coloured, and a little cracked. *Branches* ascending. *Young shoots* somewhat four-sided, total height of our young trees from twenty to thirty feet. *Leaves* opposite, petioled, from oval to oblong, entire, somewhat rough, rather obtuse, with a glandular impression on each side of the base of the rib or nerve, from six to twelve inches long, and from three to eight broad. *Petioles* about two inches long, channelled. *Stipules* none. *Panicles* terminal, solitary, broad-ovate, decussate; ramifications four-cornered, clothed with a brownish mealiness. *Bractes* small, and very early caducous. *Flowers* numerous, large, rosy and fragrant. *Calyx* cyathiform, entire, mealy, a few glands on the outside. *Corol* irregular. *Tube* short and curved. *Throat* obliquely campanulate. *Border* five-parted; *lower segment* longer, with a deep yellow mark in the centre of its base. *Stamina* as in the genus. *Anthers* bipartite. *Germ* superior, turbinate, smooth, four-celled, with one ovulum in each, attached from a little under the apex, to the upper part of the axis. *Style* the length of the stamina. *Stigma* of two unequal lobes. *Drupe* oblong, somewhat four-cornered, and obtuse, size of a large olive, smooth, when ripe of a shining bright crimson colour, one-celled. *Nut* clavate, four-cornered, four-celled, perforated from the base up the centre. *Seed* solitary, lanceo-



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late. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed. *Radicle* small, inferior.

2. G. *arborea. Roxb. Corom. pl.*

Arboreous, unarmed. *Leaves* opposite, cordate, entire, hoary underneath. *Panicles* terminal.

Cumbulu. *Rheed. Mal.* i. *t.* 41.

*Gumbharee*, the Sanscrit name of the tree.

*Beng.* Gumar, Goombar.

*Hind.* Joogani-chookur.

*Teling.* Tagoomooda.

*Tam.* Goomadee.

A large timber tree, a native of the mountainous parts of India. Flowering time the beginning of the hot season.

*Trunk* straight. *Bark* ash-coloured, in young trees, smooth. *Branches* numerous, spreading in every direction, so as to form a large shady head. *Leaves* opposite, petioled, cordate, pointed, entire, with the upper surface smooth, and the under one hoary, from four to ten inches long, and from two to six or seven broad; at the base where it joins the petiole, there are two, three, or four very conspicuous glands. *Petioles* round, villous, two or three inches long. *Panicles* terminal, ovate, composed of expanding decussated, downy racemes. *Bractes* lanceolate, downy, deciduous at an early period. *Flowers* opposite, drooping, large, yellow, tinged with brown. *Calyx* small, obscurely five-toothed, villous on the outside. *Corol* campanulate. *Border* four-parted, the upper three segments shorter; the lower or middle one bifid. *Filaments* two pairs; the longest considerably incurved. *Anthers* bifid. *Germ* round, four-celled, with one ovulum in each, attached to the top of the axis. *Style* as long as the stamen. *Stigma* bifid, one of the lobes much longer and recurved. *Drupe* oval, smooth, when ripe yellow, of the size of a damson. *Nut* four-celled, though it rarely happens that the four are fertile.

The wood of this tree is used for a variety of economical

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purposes by the natives of various countries where it grows. That of such trees as will square into logs from eighteen to twenty-four inches resembles Teak more than any other sorts I have yet met with. The colour is almost exactly the same, the grain rather closer, at the same time it is fully as light, if not lighter, and as easily worked.

Some years ago I received from Mr. M'Cleish, a Timber Merchant, then residing at Patna, but since dead, a large square log, of what I conceive to be this wood, which measured nearly thirty feet in length, and at the thickest end was full twenty-four inches square.

This piece afforded ample supplies for various experiments. One of them, and the most interesting, was made by placing part of an outside plank in the river, a little above low water mark, exactly where the worm is thought to exert its greatest powers. After remaining three years in this situation, though examined from time to time, the piece was cut, with the view of carrying a specimen of it to England, and to my great joy, I found it as sound and every way as perfect throughout, as it was when first put into the river.

Amongst other things, a valuable flood door was made of it, to keep the tides out of the Botanic garden. It is now seven years and a half since the door (which is four feet square) was made, and though much exposed to the sun and water, yet it remains good ; while similar doors, though much smaller, made of Teak, were so much decayed, a year ago, as to render it necessary to replace them.

In addition to my own experiments, I have lately learned that the decks of pinnaces to the eastward, about Chittagong, Dacca, &c. are made of this timber, because it bears the weather better than any other they know, without shrinking, or warping.

These favourable circumstances induce me to hope, that experiments will be made to ascertain its value when used for the bottoms, and upper works, of vessels, as well as for knees, curved timbers, &c.

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3. G. *villosa. Roxb.*

Arboreous, spinous. *Leaves* opposite, petioled, trapeziform, rather sub-lobate, downy underneath. *Racemes* terminal. *Bractes* lanceolate, cuspidate. *Drupes* spherical.

Radix deipara. *Rumph. Amb.* ii. *p.* 124, *t.* 39.

A native of Pulo Pinang; from thence introduced by Dr. W. Hunter, into the Botanic garden at Calcutta, in 1802. In six years, the seedling plants had reached the size of small trees, and are in flower and fruit all the year round.

*Trunk*, in our young trees, straight, as thick as a man's leg. *Bark* olive-coloured. *Branches* numerous, spreading, and drooping in every direction; *young shoots* round, and villous. *Leaves* opposite, petioled, trapeziform, with the margins entire, except that the rounded side angles sometimes project into lobes, and the apex is generally acute, smooth on the upper side, pale and downy on the under one, from one to four inches long, and from one to two broad. *Stipules* none. *Racemes* terminal, simple, downy. *Flowers* opposite, pedicelled, drooping, and scarcely so large as in G. *asiatica*, dull yellow, on account of their being clothed with ferruginous pubescence. *Bractes* large, lanceolate, cuspidate, continuing till the flowers expand. *Calyx* small, obscurely four-toothed, with some large glands on the under side, as in G. *asiatica*, but larger and more numerous, permanent. *Corol* with a narrow, curved, cylindric tube, and oblique gibbous-campanulate throat. *Border* four-parted, of which the lower one is much larger, and is a continuation of the protruded side of the throat. *Filaments* curved, one of the pairs much longer. *Anthers* bifid. *Germ* round, smooth, four-celled, with one seed in each, attached to the top of the axis. *Style* as long as the long pair of filaments. *Stigma* of two, very unequal, acute lobes. *Drupe* spherical, size of a large cherry, fleshy, smooth, when ripe yellow, one-celled. *Nut* obovate, obscurely four-lobed, smooth, four-celled, perforated by a conic cavity with its wide end downwards. This perforation is more or less on one side of the centre, according to

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the number of fertile cells, which is generally one or two only. *Seed* solitary, obovate-oblong, a little compressed. *Integument* single, brown, spongy. *Perisperm* none. *Embryo* erect. *Cotyledons* conform to the seed, obcordate. *Plumula* two-lobed. *Radicle* minute, inferior.

4. G. *asiatica. Willd.* iii. *p.* 313.

Shrubby, spinous. *Leaves* sub-opposite, oval, and somewhat lobed, smooth. *Racemes* terminal, and from the forks of the branchlets. *Bractes* small, caducous. *Fruit* oval.

Jambosa silvestris parvifolia. *Rumph. Amb.* i. *p.* 129. *t.* 40.

*Teling.* Goomoodoo.

Is one of the most common bushes in every uncultivated place over the coast of Coromandel, and in flower and fruit all the year round.

*Trunk,* I cannot say it has any thing like a distinct one, as I have always found it in the state of a large, ramous shrub. *Branches* numerous, very irregular. *Thorns* axillary, opposite, horizontal, leaf-bearing. *Leaves* on the young shoots generally opposite, on the woody branchlets fascicled, petioled, broad oval, or obcordate, irregularly lobed, both sides smooth and shining, from one to an inch and a half long, and about one broad. *Racemes* from the divisions of the branches, or terminal. *Flowers* large, yellow, opposite, approximate, drooping. *Bractes* lanceolate, small, concave, caducous. *Corol* the upper lip largest. *Anthers,* all the four are two-parted. *Stigma* two-parted, the lower four times longer and revolute. *Nut* four-celled, generally two or three of them abortive.

The only use this shrub is applied to, is for fences and fuel.

5. G. *parviflora. Corom. pl.* 2. *N.* 162.

Shrubby, spinous. *Leaves* obovate, from entire to three-lobed. *Racemes* terminal.

*Teling.* Shieri-goomoodoo.

Arbuscula Bisnagarica. *Pluk. Alm. tab.* 14. *f.* 4.

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Gmelina *coromandelica. Burm. Flor. In. p.* 32.

Is common in forests, and uncultivated places all over the coast. Flowering time October and November.

It differs from *asiatica* in the following respects.

1*st.* This is always a smaller plant, with much smaller leaves, although growing together on one spot, which is common. 2*nd.* The throns are more numerous, and always present. 3*rd.* The racemes are terminal. 4*th.* The leaves have the quality of thickening cold water like those of *Pedalium murex*, and *Menispermum hirsutum.* The flowers and fruit are in both the same.

The natives employ the water impregnated with the gelatinous quality of the leaves as a ptisan for the cure of the heat of urine in gonorrhœa. Water is also rendered glutinous by the leaves of P. *murex*, by only turning them round in it, but the water soon returns to its original state. The leaves of this plant, G. *parvifolia*, must be gently bruised with the hand in the water and it remains mucilaginous till decomposed by fermentation.

*AVICENNIA. Schreb. gen. N.* 1063.

*Calyx* five-leaved, or five-parted. *Corol* bilabiate; *upper lip* emarginate; the *under* one three-parted, reflexed. *Capsule* leathery, cordate, one-seeded.

A. *tomentosa. Willd.* iii. 395.

Arboreous. *Leaves* opposite, obovate, hoary underneath.

*Bontia germinans. Linn. sp.* 891.

*Beng.* Bina.

Oepata. *Rheed. Mal.* iv. *t.* 45.

Is common in India, in low places near the mouths of rivers, where the spring-tides rise. Flowering time the hot season. In the Soondur-bun, *i. e.* the lower part of the Delta, of the Ganges, it grows to be a tree of considerable magnitude, the wood of which serves the natives for various economical

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purposes. On the Coromandel coast, where it is common, I have only found it in the state of a ramous shrub.

*Leaves* opposite, short-petioled, obovate, and oval, entire, obtuse, very hoary underneath. *Panicles* terminal, trichotomous, bearing the flowers in terminal, single, rigid heads. *Flowers* numerous, small, of a dark dull yellow, when dry almost black. *Bractes* of the divisions of the panicle, opposite, ovate; of the calyx three-fold, one-flowered. *Calyx* five-leaved; the three bractes thereof may be reckoned three more. *Corol; tube* short, bilabiate; *upper lip* emarginate; the *lower* one of three deeply divided, equal, expanding segments. *Filaments* from the fissures of the corol. *Anthers* twin. *Germ* superior, ovate, downy. *Style* about the length of the stamens. *Stigma* of two, acute points.

*LANTANA. Schreb. gen. N.* 1026.

*Calyx* obscurely four-toothed. *Stigma* hook-refracted. *Drupe* with a trilocular nut, the lower one sterile.

L. *indica. R.*

Shrubby, straight, four-sided, hairy. *Leaves* opposite, cordate, serrate, rugose. *Peduncles* solitary, axillary, shorter than the leaves. *Heads* ovate. *Bractes* ovate-lanceolate. *Nut* two-celled.

A native of Mysore, from thence Dr. B. Heyne sent the seed to the Botanic garden at Calcutta, where the plants thrive luxuriantly, and blossom during the rains.

*Stem* ligneous, perennial, erect, four-sided, clothed with short hairs, and tinged with dark purple. *Branches* few, and like the stem. *Leaves* opposite, short-petioled, cordate, swelling on the petioles, serrate, rugose, hairy underneath, from three to four inches long, and from two to three broad. *Stipules* none. *Peduncles* axillary, solitary, shorter than the leaves, expanding, hairy, angular, and coloured like the stem. *Heads* ovate. *Bractes* one-flowered, from cordate



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below, to lanceolate near the apex, where they are sterile, all are acute and hairy. *Flowers* numerous, small, of a beautiful light purple, inodorous. *Calyx* small, margin ciliate, and obscurely divided. *Drupe* globular, smooth, purple, the size of a small pea. *Nut* turbinate, two-celled, with a seed in each; no empty cell in this species.

## *STREPTIUM.*

*Calyx* five-toothed. *Corol* funnel-shaped; *tube* twisted; *border* five parted, equal. *Germ* superior, four-celled; *cells* one-seeded; *attachment* inferior, two-partible. *Nut* wrapped in the permanent calyx. *Seed* solitary. *Embryo* erect, no perisperm.

S. *asperum. Corom. pl.* ii. *N.* 146.
Tortula *aspera. Linn. sp. pl. ed. Willd.* iii. 359.
Verbena *Forskaelei. Vahl. Symbol.* iii.
*Teling.* Obeera.

I have only found it in the vicinity of Samulkota, on the terraces and old walls of Pagodas. In flower during the wet and cold seasons, while young it looks well.

*Stem* woody, perennial, short, irregular; *branches* opposite, exactly four-sided, rough; the height of the whole plant from two to four feet. *Leaves* opposite, petioled, cordate, serrate, covered with stiff hooked hairs; from one to three inches long, and from one to two broad. *Petioles* channelled, rough. *Racemes* terminal, or in the cleft of the exterior branchlets, erect, very long; *rachis* four-sided, rough. *Bractes* solitary, one-flowered. *Flowers* towards the bottom of the raceme, remote, above approximated, small, white. *Calyx* one-leaved, oblong, gibbous, five-angled, five-grooved, five-toothed, covered with stiff, hooked hairs, permanent, closing and enlarging with the fruit, which it entirely covers. *Corol; tube* cylindric, rather longer than the calyx, twisted near the apex, a little curved; *border* five-parted; *divisions* obo-

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vate, equal. *Filaments* four, in the upper bent part of the tube. *Anthers* round, two-lobed, approaching by pairs. *Germ* four-celled, with one ovulum in each attached to the bottom of its cell. *Nut* wrapped in the permanent calyx, spontaneously separating into two, singly straight on the inside; gibbous on the outside, and there armed with obtuse hornlets, two-celled, with a large spurious cell or cavity on the inside. *Seeds* solitary, curved, clavate. *Integuments* single, pure white, and very thin. *Perisperm* none. *Embryo* white, conform to the seed, erect. *Cotyledons* linear-oblong. *Plumula* minute. *Radicle* inferior, pointed.

I have not found that this plant is put to any use.

### *LIMOSELLA. Schreb. gen. N.* 1039.

*Calyx* from three to five-cleft. *Corol* from four to five-cleft. *Stamina* approximated by pairs. *Capsule* one or two-celled, two-valved, many-seeded.

L. *diandra. Willd.* iii. 342.

Creeping. *Leaves* paired, linear. *Scapes* solitary, as long as the leaves, one-flowered. *Capsules* two-celled.

An exceedingly small plant, found growing at the bottom of clear, standing, fresh water. *Stoles* numerous, creeping, filiform, jointed, so intricately interwoven, that a distinct specimen is not easily separated.

*Leaves* sessile, two at each joint, erect, linear, wedge-formed, obtuse; about three quarters of an inch long, and the sixteenth of an inch broad. *Peduncles* solitary, erect, between the pair of leaves, and of the same length, one-flowered. *Calyx* three-cleft; *segments* unequal. *Corol; tube* cylindric, a little curved, of the length of the calyx; *border* spreading, unequal; *upper division* largest, wedge-formed, three-toothed; *lateral segments* smaller and oval, the lower one is the least of all. *Filaments* two, in the tube of the corol. *Anthers*



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oval. *Stigma* oblong. *Capsule* oval, covered by the calyx, two-celled, the receptacle is large, and in the centre, but the partition is exceedingly thin. *Seeds* numerous.

*ERINUS. Schreb. gen. n.* 1034.

*Calyx* five-leaved. *Corol* five-cleft, sub-equal. *Capsules* bilocular, many-seeded.

E. *bilabiatus. R.*

Annual, erect, villous. *Leaves* opposite. *Spikes* axillary and terminal, long-peduncled, crowded. *Corol* bilabiate.

This plant has been reared in the Botanic garden near Calcutta, from seeds received from the Moluccas. It blossoms and ripens its seed between October and December.

*Stem* annual, erect, villous, almost round. *Branches* few, opposite; the height of the whole plant about two feet. *Leaves* opposite, oblong, a little reflexed, slightly serrate; scabrous on both sides, length of the cauline leaves about two inches, those near the inflorescence under one inch. *Flowers* numerous, collected into round, cylindric, imbricated, terminal spikelets, or heads. *Bractes* three-fold, one-flowered, subclavate, hairy. *Calyx* five-leaved, on the base five-parted, hairy. *Corol* bilabiate, small, blue; *upper lip* emarginate; the *under* one three-lobed; *lobes* revolute. *Anthers* approaching by pairs, roundish. *Stigma* two-lobed. *Capsule* ovate, two-lobed, two-valved, when ripe the valves separate half way down; partitions double. *Seeds* numerous.

*CAPRARIA. Schreb. gen. N.* 1030.

*Calyx* five-parted. *Corol* campanulate. *Capsule* two-celled, two-valved, many-seeded.

1. C. *gratissima. Roxb.*

Annual, erect, with creeping roots. *Leaves* opposite, sub-

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sessile, oblong, serrate. *Flowers* axillary, solitary, sub-sessile.

*Pola* tsjira. *Rheed. Mal.* ix. *t.* 78.

This plant I have only found in rills of fresh water among the Circar mountains. It is annual with a creeping root, sending up many shoots, or ramous stems of from one to two feet high; they are round, smooth and jointed, and as thick as the little finger; all the joints under water emit many fibrous roots, or multifid, filiform leaves.

*Leaves* opposite, short-petioled, oblong, serrate, a little rugose, sprinkled on the under side with innumerable, glandular dots, about two and a half inches long, and one broad. *Flowers* axillary, generally solitary, short-peduncled, purple. *Calyx; upper divisions* largest, incumbent. *Corol* campanulate; *upper lip* broader and emarginate. *Nectary*, a yellow ring surrounding the base of the germ.

It is delightfully aromatic, and has a sweet pleasant taste.

2. C. *diffusa. R.*

Suffruticose, diffuse. *Leaves* opposite, petioled, lanceolar, obtuse, entire. *Spikes* axillary, and terminal, shorter than the leaves.

From Pegue it was introduced by the Rev. Mr. F. Carey into the Botanic garden at Calcutta, where it flowers and ripens its seeds during the whole of the dry season.

*Stem* scarcely any, but numerous, opposite, diffuse branches and their sub-divisions, spread close to the ground, all are round, and the younger parts harsh with very short hair; whole spread of the plant about two feet high. *Leaves* opposite, short-petioled, lanceolar, obtuse, entire; from one to three inches long, and under one in breadth. *Spikes*, or *racemes*, for the flowers are short-pedicelled, axillary, and terminal, clammy, villous, much shorter than the leaves. *Flowers* small, purple, opposite, and alternate. *Bractes* linear-lanceolate, one beneath each pedicel, and two pressing the calyx laterally. *Calyx* of five unequal, linear, villous,

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clammy segments, which are as long as the tube of the corol. *Corol* tubular. *Border* of five, nearly equal, rounded divisions. *Anthers* twin. *Germ* ovate-oblong, two-celled, with four vertical rows of seeds in each. *Style*, the length of the tube of the corol. *Stigma* of two very unequal, acute lobes. *Capsule* linear, scarcely so long as the permanent calyx, furrowed on opposite sides, two-celled, two-valved. *Partitions* contrary, composed of the incurved margins of the valves, and free from each other in the centre. *Seeds* numerous, minute, round, and tubercled.

*STEMODIA. Schreb. gen. N.* 1043.

*Calyx* five-parted. *Corol* bilabiate. *Stamina* four, with each filament two-cleft, two-anthered. *Capsule* two-celled.

1. S. *viscosa. Corom. pl.* ii. *N.* 163.

Annual, hairy and glutinous. *Leaves* opposite, stem-clasping, linear-cordate, serrate. *Flowers* axillary, solitary.

*Teling.* Boda-sarum.

A small, annual plant, found on dry rice fields after the crop has been cut. *Stem* annual, generally bent to one side, with many spreading branches from its base, four-sided, hairy, clammy; from six to twenty-four inches high. *Leaves* opposite, stem-clasping; below linear-oblong, above cordate, hairy, clammy. *Flowers* axillary, solitary, peduncled, small, of a violet colour. *Bractes* two, lanceolate, pressing on the calyx. *Corol; tube* compressed, longitudinally wrinkled, twice the length of the calyx; *upper lip* broad, emarginated; the *under lip* three-parted. *Stamens* within the tube.

The plant has a pleasant aromatic smell.

2. S. *ruderalis. Willd.* iii. 345, &c.

Annual, diffuse, downy. *Leaves* opposite, petioled, ovate, serrate. *Flowers* axillary, solitary, sub-sessile. *Calyx* five-toothed. *Corol* deeply two-cleft.

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Found on old walls about Calcutta. It flowers during the rains.

*Root* ramous, seems perennial. *Stems* many, ascending, ramous, herbaceous, woody, somewhat viscous, the whole plant about twelve or eighteen inches high. *Leaves* opposite, petioled, ovate, deeply serrate, soft, a little hairy; about an inch long. *Petioles* shorter than the leaves, channelled. *Stipules* none. *Flowers* axillary, sub-sessile, solitary, opposite, small, yellow. *Calyx* ten-furrowed, five-toothed, permanent. *Corol* personate; *tube* the length of the calyx; both lips projecting, and shut; apex of the under lip broad, depending, three-toothed, of the upper one very narrow, bifid; inside of both hairy, and beautifully marked with small purple dots. *Filaments* and *anthers*, as in the genus. *Stigma* slighty two-lobed.

*TORENIA. Schreb. gen. N.* 1011.

*Calyx* bilabiate. *Corol* irregular, one pair of the filaments with a barren branchlet. *Capsule* two-celled, many-seeded; partition parallel.

1. T. *cordifolia. Corom. pl.* ii. *p.* 2. *f.* 161.

Annual, brachiate, four-sided. *Leaves* petioled, cordate, serrate. *Calyx* two-cleft, with divisions two and three-toothed. *Nut* cordate, serrate. *Calyx* two-cleft, with divisions two and three-toothed.

Corosinam. *Rheed. Mal.* ix. *t.* 68.

A native of the Circars, appearing in the dry season.

2. T. *diffusa.*

Annual, diffuse. *Leaves* sessile, cordate, serrate. *Flowers* solitary, long-peduncled. *Calyx* five-parted, superior filaments with a sterile branch.

Vandellia diffusa. *Willd.* iii. 343.

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A native of Coromandel, where it appears during the rainy season.

3. T. *hians.*

Annual, creeping, four-sided. *Leaves* petioled, cordate, serrate. *Flowers* axillary, solitary, peduncled. *Calyx* five-winged. *Stigma* of two large, round, cordate lobes.

A native of Amboyna, Chittagong, &c. It flowers in the Botanic garden about the close of the rains; when its numerous, large, beautiful dark blue violet flowers are highly ornamental.

4. T. *multiflora.*

Annual, erect, ramous, four-sided, smooth. *Leaves* opposite, oblong, sub-serrate. *Flowers* terminal. *Calyx* five-parted. *Corol* bilabiate, superior filaments, with a sterile branch. *Capsules* ovate.

A native of Bengal, appearing in the rainy and cool season.

5. T. *varians.*

Annual, erect, four-sided, smooth. *Leaves* opposite, petioled, cordate, ovate, serrate. *Flowers* axillary, solitary. *Calyx* five-toothed. *Corol* ringent. Longer filaments, with a sterile branch. A native of Coromandel and Bengal, where it appears during the rainy season.

6. T. *vagans. R.*

Straggling, smooth. *Leaves* ovate, oblong, serrate. *Flowers* axillary, long-peduncled. *Calyx* winged, both lobes acute and entire.

An extensive rambler, a native of Chittagong, where it delights in moist shady places.

*Flowers* large and blue, they appear in greatest profusion in October.

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*COLUMNEA. Schreb. gen. N.* 1064.

*Calyx* five-parted. *Corol* ringent. *Anthers* twin, connected by pairs in a coronet. *Capsule* two-celled.

1. C. *balsamica. R.*

Annual, erect, stoloniferous. *Leaves* sub-verticelled, pinnatifid. *Peduncles* axillary, solitary, one-flowered.

Tsjeria-manga-mari. *Rheed. Mal.* ix. *t.* 85.

Tsadaen-tsjira. *Rheed. Mal.* xii. *t.* 36 seems the same.

Hottonia. *Burm. Zeyl. t.* 55. *f.* 1.

Gratiola *trifida. Linn. sp. pl. ed. Willd.* i. 104.

*Beng.* Kurpoor.

Hottonia *Indica. Linn. sp. pl. ed. Willd.* 1813.

Ruellia balsamica. *König's Mss.*

This is a small annual; the general height about six inches, a native of marshy places, appears and flowers during the rainy and cold seasons.

*Roots* creeping. *Stems* erect, sometimes ramous, round, jointed, smooth. *Leaves* sessile, the lower are generally verticelled, or nearly so, above three-fold, and opposite; some are pinnatifid, some lobate, and some simply linear-lanceolate, all are serrate toward the apex, smooth on both sides, generally less than an inch long. *Peduncles* solitary, axillary, rather longer than the leaves, one-flowered, sometimes they are opposite and even tern towards the top of the plant. *Bractes* two, pressing on the calyx. *Stigma* large, in shape like a dog's head, with the under division very long, and ascending. *Capsule* long, two-celled, four-valved; *receptacle* large. *Seeds* numerous.

As König observes, the plant has a strong terebinthinaceous smell, it is at the same time very grateful. The taste is that of a warm aromatic.

2. C. *Heterophylla.*

Annual; *root* creeping. *Lower leaves* verticelled, when



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under water filiformly-pinnatifid; *floral leaves* sessile. *Corol* somewhat bilabiate.

A native of Bengal, in wet places, during the dry season.

3. C. *tomentosa.*

Annual, diffuse. *Leaves* generally opposite, wedge-shaped, with gashed margins. *Racemes* terminal, with ample five-cleft calyx, and ringent corol.

A native of Bengal, appearing during the cool season.

4. C. *minuta.*

Annual, spreading, four-sided. *Leaves* sessile, ovate-cordate, serrulate. *Flowers* axillary, long-peduncled. *Calyx* five-cleft. *Corol* ringent. *Capsules* globular.

A native of various parts of India, appearing during the rainy and cold season.

*GERARDIA. Schreb. gen. N.* 1004.

*Calyx* five-cleft. *Corol* irregular, sub-campanulate; *lower lip* three-parted, lobes emarginate, the middle segment two-parted. *Capsule* from two to three-celled, from two to three-valved.

G. *delphinifolia. Corom. pl.* i. *N.* 90.

Annual, erect, ramous. *Leaves* pinnatifid, with filiform segments.

Antirhhina adfinis madraspatam cappilaceo folio. *Pluk. p.* 17. *t.* 358. *f.* 3.

A very elegant, erect, annual plant; a native of the mountainous parts of the country. Flowers during the wet and cold season.

*Stem* annual, straight, ramous, four-angled, four-grooved, about three or four feet high; spotted with dark purple. *Branches* opposite, like the stem. *Leaves* opposite, irregularly pinnatifid; *divisions* linear, as in *Ipomœa quamoclit.*

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*Flowers* axillary, solitary, short-peduncled, large, rose-coloured. *Bractes* two, filiform, pressing on the calyx laterally. *Calyx* one-leaved, five-cleft; divisions linear, erect, permanent. *Corol* regular; *tube* sub-campanulate, two or three times longer than the calyx; *border* five-parted; *segments* equal, rounded. *Filaments* four, the *superior* pair ending in a recurved hook, the *inferior* in an erect horn. *Anthers* linear, the *superior* pair approach archways, so that their apices meet; the *lower* pair firmly united their whole length. *Germ* ovate. *Style* length of the tube. *Stigma* enlarged, entire. *Capsule* oblong, about as long as the calyx, two-celled, two-valved; *receptacle* columnar. *Seeds* numerous.

*DIGITALIS. Schreb. gen. N.* 1017.

*Calyx* five-parted, irregularly campanulate, five-cleft, gibbous. *Capsule* ovate, two-celled.

D. *stricta.*

Annual, straight, scabrous. *Leaves* opposite, linear, scabrous. *Flowers* solitary. *Calyx* pitcher-shaped, with a slit on the under side.

An elegant annual species, found on pasture ground over Bengal. Flowering time the rainy season.

. *Stem* straight, from one to two feet high; *branches* few, opposite, nearly straight, all covered with much short, harsh hair; towards the apex somewhat four-sided. *Leaves* opposite, sessile, linear, almost entire, very scabrous, size very various. *Flowers* sub-sessile, the *inferior* ones nearly opposite, the *upper* one alternate; pretty large for the size of the plant. *Bractes* two pressing on the calyx laterally, they are of a lanceolate shape, and shorter than the calyx. *Calyx* ovate, nearly shut at the mouth, five-ridged, scabrous, slit underneath. *Corol, tube* somewhat bellied, twice as long as the calyx, colour a deep purplish red. *Border* of five broad, nearly equal, obcordate, rose-coloured divisions. *Filaments* woolly. *An-*



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*thers* of two lobes, the smaller of which ends in a sharp projecting hornlet.

*CELSIA. Schreb. gen. N.* 1015.

*Calyx* five-parted. *Corol* rotate. *Filaments* bearded. *Capsule* two-celled.

C. *coromandeliana. Vahl. Symb.* iii. 79. *Willd.* iii. 280.

Annual, erect, ramous, downy. *Lower leaves* lyrate, *superior* sessile, cordate. *Pedicels* as long as the bractes, divisions of the calyx lanceolate, entire, and serrulate.

*Beng.* Kookshima.

A native of various parts of India, appearing during the dry season, and generally as a weed in gardens, or on cultivated land.

*SESASMUM. Schreb. gen. N.* 1048.

*Calyx* five-parted. *Corol* irregularly campanulate, five-lobed, with the lower one larger, and protruding. *Stigma* of two equal, lanceolate lobes. *Capsules* four-celled, two-valved.

S. *orientale. Willd.* iii. 358.

*Leaves* ternate and simple, the *superior* always simple and narrower.

*Sans.* Tila.

*Pers.* Roghen.

*Arab.* Duhn.

*Teling.* Novu.

Gingeli, is the name by which it is generally known amongst Europeans on the Coromandel coast.

Schit-elu. *Rheed. Mal.* ix. *f.* 54. and I believe fig. 55 is also the same.

This species or variety, is by far the most generally cul-

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tivated in the warmer parts of Asia. It is annual, and in a good soil grows generally to be about three or four feet high. I never found it in a wild state.

My figure of this plant, called S. *indicum* by Linnæus, is the *Krishna til* of the Hindoos, I can at most make only a variety of this species; It is larger, more ramous, the stem and branches tinged with a rusty, reddish colour; the *leaves* a darker green; but in situation and structure the same. The flowers are deeper tinged with red, and the seed darker coloured. Both are described by Rumphius, p. 204. &c. of the 5th volume of his *Herbarium Amboinense. Fig.* 1. *t.* 76. of the same volume is a tolerable diminished figure of this variety. Their greatest difference, however, appears in the seed, and harvest time.

The former, S. *orientale*, is sown in Bengal in February, and the crop got in three months afterwards, so that the dews, and the little remaining moisture of the earth, are the only sources of humidity by which it can benefit, as this is in general a period of drought. S. *indicum* is sown on high places, about the beginning of the rains, June; and the crop cut down in September.

### *BIGNONIA. Schreb. gen. N.* 1018.

*Calyx* various. *Corol*, with the throat campanulate, and a five-cleft border. *Germ* superior, two-celled; *cells* many-seeded; *attachment* interior. *Silique* bilocular (partition contrary), containing many thin winged seeds. *Embryo* centripetal, no perisperm.

1. B. *undulata. R.*

Arboreous. *Leaves* opposite, simple, linear-lanceolate, much waved. *Racemes* lateral. *Calyx* campanulate, with the mouth cut into five, short emarginate segments. *Silique* linear, a little compressed, smooth, partition contrary.

A native of Hindoostan, from thence sent to the Botanic

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garden by Colonel Hardwicke, where it flowers in March, and ripens its seed in May. When in full flower it is one of the most beautiful small trees I have seen.

*Trunk* erect, in trees eight years old, as thick as a man's thigh, and the whole tree about twenty-five feet high. *Bark* scabrous, of a brownish ash-colour. *Branchlets* drooping, like the weeping willows. *Leaves* simple, opposite, petioled, drooping, linear-lanceolate, apex scarcely pointed, entire, much waved, clothed with minute micaceous scales. *Petioles* slender, channelled. *Stipules* none. *Racemes* lateral, from branchlets of one or two years growth, two or three inches long, five or six-flowered. *Bractes*, one at the base of each pedicel, and an opposite pair a little further up, caducous. *Flowers* very large, erect, orange-coloured, inodorous. *Calyx* campanulate, five-toothed; *segments* short, rounded, often emarginate. *Corol; tube* obliquely campanulate. *Border* four-parted; the *upper division* larger, and divided into two rounded lobes; the *under* three, equal, and nearly round, with the margins slightly waved. *Filaments* five, the single one small, and abortive. *Anthers* double. *Germ* linear, two-celled, with numerous ovula in each, attached to two longitudinal swellings on each side of the partition. *Style* the length of the stamina. *Stigma* of two thin, oval, acute lobes. *Silique* linear, curved, considerably flattened, so as to bring the sutures into the middle of the sides; about six or eight inches long by one in circumference, two-celled, two-valved; *valves* smooth, thin, and of a light brown colour. *Partition* thin, of a dark brownish black, contrary, that is, crossing the sutures, and attached to the middle of the valves. *Seeds* many, imbricate, thin, with a very thin white membranaceous wing all round; attached to the partition about half way between its middle and the margins. *Perisperm* none. *Embryo* with two-lobed cotyledons, and the point of the radicle immediately within the umbilicus.

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2. B. *comosa.*

Tender parts very downy. *Leaves* simple, opposite, cordate, entire. *Corymbs* terminal, short, leafly. *Calyces* five-cleft. *Corol*, with a long, slender tube, and bilabiate border.

A native of the Moluccas.

3. B. *spathacea. Corom. pl.* 2. *N.* 144.

Arboreous. *Leaves* opposite, pinnate; *leaflets*, from three to seven pairs, with an odd one, roundish. *Racemes* terminal. *Calyx* spathaceous. *Corol* infundibuliform, oblique, long, slender, much curved.

B. *falcata. Kön. Mss. in. B. H.*

*Teling.* Woody.

A small thin tree, a native of most of the forests on the coast, flowers during the hot season.

*Trunk* very irregular, both in size and shape, the *branches* also. *Bark* light ash-colour; *young shoots* covered with whitish down. *Leaves* opposite and alternate, pinnate, with an odd one about six inches long. *Leaflets* opposite, from two to three pairs, nearly orbicular, entire, downy; from one to two inches long, and about as much broad. *Racemes* terminal, erect, as long as the leaves, few-flowered. *Flowers* white, pretty large. *Calyx*, a spathe, two-thirds open on the convex side. *Corol; tube* longer than the calyx, cylindric; *border*, flat *divisions* equal, oblong. *Nectary*, a dark purple ring, surrounding the base of the germ. *Stamens*, there is a fifth sterile filament. *Anthers* oval. *Stigma* two-lobed. *Silique* linear, about twelve inches long, pendulous, twisted in various forms.

4. B. *crispa. Buch.*

Arboreous. *Leaves* pinnate; *leaflets* five or seven, oblong, entire. *Calyx* spathaceous. *Corol* hypocrateriform, with segments of the border sub-equal, and much curled. *Silique* linear; *partition* contrary.

A native of Mysore, where it was found by Dr. Bucha-

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nan, who sent seeds to the Botanic garden at Calcutta, where in seven years the trees were about twenty feet high ; it blossoms in May and June ; *seed* ripe in December.

*Trunk* straight, covered with smooth, ash-coloured bark. *Branches* tolerably erect, but not numerous. *Leaves* opposite, pinnate, from six to ten inches long ; in Bengal, permanent. *Leaflets* five or seven, rarely ternate, petioled, oblong, entire, villous while young, from two to four inches long. *Racemes* solitary, terminal, bearing a few opposite, long-pedicelled, large, pure white, fragrant flowers, which expand in the evening, and drop in the morning. *Calyx* a perfect spathe, opening on the upper side, shorter than the tube of the corol, deciduous with or soon after the corol. *Corol* salver-shaped. *Tube* sub-cylindric. *Border* of five, somewhat reniform, equal segments; all much and beautifully curled. *Stamens*, a fifth, small, sterile filament. *Anthers* twin. *Germ* conical, its base surrounded with a glandular ring, two-celled, in each many ovula attached to a longitudinal, elevated receptacle, which runs along the middle of the partition. *Style* shorter than the tube of the corol. *Stigma* of two, thin, oblong lobes. *Silique* linear, pendulous, about twelve or fifteen inches long, by one and a half in circumference, variously bent, obtuse-pointed, colour brown and scabrous, with still paler specks ; a transverse section forms a very exact ellipsis, two-celled. *Partition* thick and spongy, contrary to the valves, and attached to the middle of them. *Seeds* numerous, winged at both ends, disposed in two imbricate rows in each cell, and attached to the middle of the opposite sides of the thick spongy partition, where it joins the valves, being the part most remote from its sutures. *Perisperm* none. *Embryo* straight. *Cotyledons* two-lobed ; *lobes* nearly orbicular. *Radicle* oval, immediately within the umbilicus.

5. B. *suaveolens. R.*

Arboreous. *Leaves* pinnate ; *leaflets* three pairs, oval, serrulate. *Panicles* terminal, thin, first divisions brachiate. *Corol* woolly. *Silique* cylindric.

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*Patali* the Sanscrit name. See *Asiatic Res.* 291.

*Beng.* Parul.

*Hind.* Paral.

B. *padri. Kön. Mss.* and *B. H.*

A middle sized tree, a native of Bengal, and of the southern parts of the Coromandel coast. Flowering time the hot season.

*Trunk* tolerably erect, though not straight. *Bark* ash-coloured, and somewhat scabrous. *Leaves* opposite, pinnate, with an odd one from twelve to twenty-four inches long. *Leaflets* opposite, from two to four pairs, oval, with long, bluntish, narrow points, slightly serrate, having both sides downy while young, and when full grown not downy and feeling harsh; the exterior pair and odd one about six inches long, by three or four broad; the inferior pair, or pairs, smaller. *Petioles* swelled at the base, roundish, when old scabrous. *Panicles* terminal, composed of a few spreading branchlets; the first and second pairs thereof opposite, the superior dichotomous, with a solitary, pedicelled flower in the forks; all are downy, and somewhat viscid. *Flowers* large, of a dark, dull, crimson colour, exquisitely fragrant. *Calyx* campanulate. *Border* four-cleft; *upper divisions* with two minute points, outside a little villous. *Corol; throat* ample, woolly, convex above, flat and plaited beneath. *Border*, the *upper divisions* shorter, erect; the *three inferior* ones longer and projecting, with the margins of all much curled. *Filaments* four, fertile, and between them a small sterile one. *Anthers* twin. *Germ* oblong, clavated on a glandular receptacle. *Stigma* two-lobed.

6. B. *grandiflora. Willd.* iii. 302.

Shrubby, scandent. *Leaves* pinnate; *leaflets* ovate, serrate. *Panicles* terminal, pendulous, divisions of the calyx lanceolate, length of the corol.

*Chin.* Tung-vong-fa.

A large scandent shrub, a native of China, runs over bushes,



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&c. emitting roots from the joints; the bark cracks, and peels off; otherwise it is smooth.

*Young shoots* spotted with dark purple. *Leaves* opposite, pinnate, from six to ten inches long. *Leaflets* opposite, from three to four pairs, with an odd one, oval, deeply serrate, pointed, tolerably smooth. *Petioles* deeply channelled, as if winged. *Stipules* none. *Flowers* terminal, forming pendulous, cross-armed panicles, they are large, on the outside of a tawny orange colour, on the inside of a tolerably bright, reddish-orange, with brighter streaks. *Calyx* and *corol* as in the genus. *Nectary*, a glandular, crenulate ring surrounding the base of the germ. *Stamens* a fifth sterile filament between the short pair. *Stigma* two-parted; anterior lip recurved. When in flower it is very ornamental.

7. B. *chelonoides. Willd.* iii. 304.

Arboreous. *Leaves* pinnate; *leaflets* about four-paired, with an odd one, from ovate to oblong, entire, cuspidate. *Panicles* terminal. *Corol* bilabiate. *Siliques* pendulous, long, slender, sub-cylindric, with sharp edges, and variously curved.

Padri. *Rheed. Mal.* vi. *t.* 26.

*Tam.* Pou-padyra-marum.

*Teling.* Tagada.

A native of the mountainous parts of the coast of Coromandel, where it grows to be a large tree. Flowers during the hot and rainy seasons, and the seed ripens in December and January.

*Trunk* very straight, and of a great height and thickness. *Bark* thick, scabrous, brown. *Branches* very numerous, the inferior horizontal, above gradually becoming more and more erect to the top. *Leaves* opposite, pinnate, with an odd one, about twelve inches long. *Leaflets* opposite, short-petioled, generally four pair, the inferior smallest, obliquely oval, pointed, sometimes slightly notched about the margins, when young downy, afterwards smooth, about four inches

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long, by two broad. *Petioles* about nine inches long, channelled, smooth. *Stipules* none. *Panicles* terminal, the larger ramifications decussate, the smaller or terminal two-forked, with a sessile flower in the cleft. *Peduncles* and *pedicels* round, covered with oblong, gray, scabrous specks. *Bractes* small, caducous. *Flowers* pretty large, yellow, very fragrant. *Calyx* five-notched. *Nectary* a yellow fleshy ring surrounding the base of the germ. *Filaments*, there is a fifth sterile one between the lower pair. *Anthers* double. *Stigma* two-cleft. *Silique* very long, slender, twisted; *receptacle* of the seeds spongy, white, with alternate notches on the sides for the seeds to lodge in.

The wood of this tree is high coloured, hard, durable, and of much use amongst the inhabitants of the hills, where it is plentiful.

8. B. *quadrilocularis. Corom. pl.* 2. *N.* 145.

Arboreous. *Leaves* three-fold, or scattered, pinnate; *leaflets* from four to five pairs, with an odd one, serrate, smooth. *Panicles* terminal, dense, downy. *Siliques* linear, lanceolate, four-celled.

A large tree, a native of the Circar mountains. Flowers during the beginning of the hot season.

*Trunk* straight, and of considerable height. *Bark* gray, with a few scabrous spots. *Branches* numerous, spreading, forming a large shady head. *Leaves* about the extremities of the branchlets, generally three-fold, unequally pinnate, from twelve to twenty-four inches long. *Leaflets*, from four to five pairs, opposite, oblong, serrate, acute, smooth. *Stipules* none. *Panicles* terminal, erect, large, dense, many-flowered, very downy. *Bractes* scarcely any. *Flowers* large, rose-coloured, delightfully fragrant. *Calyx* generally two-parted, with the *upper lip* two-cleft, very downy. *Corol; border* five-parted; *divisions* equal, with their margins elegantly waved. *Stamens*, here is also a fifth sterile filament. *Anthers* double. *Nectary* as in B. *spathacea*. *Stigma*



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two-cleft. *Silique* erect, straight, linear, pointed, pretty smooth, twelve inches long, two broad, and half an inch thick, four-celled, two-valved, the dissepiment is enlarged in the middle on each side, with a sharp ridge which touches the sides of the valve, dividing each of the usual cells into two; into these ridges the seeds are affixed, hence I have taken my specific name.

The wood of this tree is employed for many purposes by the natives.

9. B. *stipulata. R.*

Arboreous, tender parts villous. *Leaves* pinnate; *leaflets* from four to six pairs, from oval to oblong-elliptic; common petiole channelled. *Stipules* a tuft of sessile, orbicular ones in each axill.

A large tree, a native of Pegue, from thence introduced by the Rev. Mr. F. Carey, into the Botanic garden at Calcutta, where in two years it rose to the height of ten feet, with a simple trunk, which is considerably four-cornered toward the top.

*Leaves* opposite, about two feet long; *leaflets* from nine to fourteen, the largest of them a foot long, by six inches broad. *Common petiole* much swelled at the insertion of the leaflets, with a channel running down the upper edge. It has not yet blossomed in Bengal, but the siliques sent from Pegue were cylindric.

10. B. *xylocarpa. R.*

Arboreous. *Leaves* bi- and tri-pinnate; *leaflets* from obliquely oblong to semi-cordate. *Panicles* terminal; *segments* of the border of the corol round, and curled. *Siliques* linear, crooked, ligneous, and tubercled.

A tall, elegant tree, a native of Soonda, where it was first observed by Dr. Andrew Berry, and by him introduced into the Botanic garden at Calcutta, where in six years the young trees were about twenty, or twenty-five feet high; they

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blossom in March, April, May and June, and the seed takes about one year to ripen.

*Trunk* very straight. *Bark* ask-coloured, rather spongy, and considerably cracked. *Branches* few and spreading but little. *Leaves* opposite, bi- and tri-pinnate, from one to four feet long; in Bengal they are deciduous in the cool months of December and January, and appear with the flowers in April and May. *Leaflets* short-petioled, from semi-cordate to obliquely-oblong, entire, pointed, hard though void of pubescence, from two to five inches long. *Petioles* common and partial, channelled, and scabrous, with numerous, elevated gray specks. *Panicles* terminal, ramifications thereof opposite, or tern, two, three, or more times dichotomous, with a single flower in the forks, slightly pubescent. *Bractes* ovate-oblong, solitary on the outside of the divisions only. *Flowers* large, white, with a tinge of yellow, and delightfully fragrant. *Calyx* campanulate, coloured, unequally five-toothed. *Corol*, with a short-cylindric tube, large, campanulate throat, and five-parted border; *segments* sub-orbicular, nearly equal, and much curled. *Stamina* as in the family, with a small fifth sterile one. *Germ* oblong, an annular gland round its base, two-celled, with numerous seeds attached to two, thick, equi-distant receptacles on each side of the partition. *Style* the length of the stamina. *Stigma* of two oblong, thin lobes. *Siliques* linear, variously bent, about two feet long; the greatest diameter one inch and a half, and parallel with the valves; and the transverse one, one inch; of a very hard, woody texture, and extremely rough, with numerous, large, irregular, hard tubercles, which would render it a dangerous bludgeon, one-celled, two-valved. *Partition* contrary, sub-cylindric, spongy. *Seeds* numerous, winged, small. *Perisperm* none. *Cotyledons* thin, nearly roun d, emarginate. *Radicle* short, pointing to the umbilicus.

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11. B. *indica. Willd.* iii. 306.

Arboreous. *Leaves* supra-decompound. *Flowers* pentandrous. *Siliques* long, linear, compressed.

Bignonia *pentandra. Lourier. Cochin Ch.* 460.

Palega pajoneli. *Rheed. Mal.* i. *t.* 43 and 44.

Shyonaka, and Mundooka-*purna*, two of its Sanscrit names.

*Hind.* Shyona.

*Tam.* Vanga-marum.

*Teling.* Pampena.

Is one of the tallest trees on the coast, grows up amongst the mountains chiefly. Flowering time the beginning of the wet season. *Seed* ripens in January and February.

*Trunk* very straight, and very high, but thin in proportion. *Bark* smooth. *Branches* opposite, decussate. *Leaves* opposite, decussate, supra-decompound; from four, to six feet long. *Leaflets* obliquely-cordate, pointed, smooth, from three to six inches long, and from two to four broad. *Peduncles* and *pedicels* round, scabrous. *Racemes* terminal, secund, erect, rigid, lower two-thirds naked, scabrous, and somewhat quadrangular; *upper* third part imbricated on one side, with very large, fleshy, dark red flowers. *Bractes*, scarcely any. *Calyx* campanulate, entire, lasting. *Corol* campanulate. *Border* two-lipped; *upper* two-cleft, *under* three-cleft; *segments* wrinkled nearly. *Filaments* five, the exterior pair longest, bending in under the upper lip of the corol; at the base very woolly. *Anthers* five pairs, singly oblong, bursting on the under side. *Nectary*, a large, fleshy, somewhat pentagonal body surrounding the base of the germ. *Germ* oblong. *Style* the length of the stamens, hollow its whole length; *mouth* funnel-shaped, opening between the two membranaceous, orbicular lobes of the stigma. *Silique* very large, retrofracted, transversely compressed, somewhat curved, with the convexity upwards. *Seeds* numerous, membranaceous, surrounded with a large, delicate membranaceous wing.

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The wood of this tree is said to be soft and spongy, so much as to render it unfit for use; at least I have never been able to discover any that it is put to.

12. B. *suberosa. R.*

Arboreous. *Bark* deeply cracked, and spongy. *Leaves* supra-decompound; *leaflets* sub-cordate, entire. *Panicles* terminal. *Anthers* calcarate. *Silique* linear, thin.

Millingtonia hortensis. *Willd.* iii. 382.

The native country of this beautiful tree, I have not been able to discover; all I can learn is, that some plants or seeds were brought from the Rajah of Tanjore's garden to Madras, from thence one plant was procured for the Company's Botanic garden at Calcutta, about fifteen years ago. It is now, when twelve years old, an elegant tree of about fifty feet in height. Is in blossom about the close of the rains and the seed ripens in March.

*Trunk* straight. *Bark* deeply cracked in various directions, of a soft, spongy nature. The wood is white, firm, and close-grained, and promises to be valuable. *Leaves* opposite, supra-decompound, about two feet long. *Leaflets* sub-cordate, with long taper obtuse points; *margins* entire, of a deep green colour, smooth on both sides, from one to three inches long and broad. *Petioles* and *petiolets* a little chanelled. *Panicles* terminal, solitary, cross-armed, large, broad-ovate. *Ramifications* horizontal, the first trichotomous, then dichotomous, with generally a single flower in the fork. *Bractes* minute. *Flowers* numerous, large, pure white, like many of the other species of this charming family delightfully fragrant. *Calyx* very small, slightly five-parted; *divisions* nearly equal. *Corol* infundibuliform. *Tube* from two to three inches long, slender and cylindric. *Border* four-parted; the *upper* division broader, and nearly half two-cleft. *Filaments* only four. *Anthers* calcarate. *Germ* oblong. *Style* as long as the corol. *Stigma* bilabiate. *Silique* slender, linear, thin, pointed, pretty smooth, two-

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celled; about twelve inches long, by three quarters of an inch broad, and one line thick. *Partition* parallel. *Seeds* numerous, round, very thin, surrounded with a remarkably fine transparent wing. *Perisperm* none. *Embryo* with two reniform, emarginate cotyledons, and the radicle pointing directly to the umbilicus.

### *INCARVILLIA. Juss. Willd.*

GEN. CHAR. *Calyx* campanulate, five-parted. *Corol* with an oblique gibbous tube, and unequally five-parted border. *Germ* superior, four-celled; *cells* many-seeded, attached to the involute margins of the partitions. *Capsule* siliqua-form, one-celled, four-valved. *Seeds* numerous, winged. *Embryo* inverse, without perisperm.

1. I. *parasitica. Roxb.*

Shrubby, parasitic, smooth. *Leaves* opposite, lanceolar, veinless, fleshy. *Umbels* terminal.

A native of the forests which cover the Garrow hills, where it is found growing on trees; but shows a partiality for such places as retain decayed vegetable matter. In the Botanic garden it grows freely in a soil composed of rotten wood and garden mould. Flowering time the rainy season, when nothing can exceed the beauty of its numerous, large, pendulous, crimson-yellow flowers, approaching in shape and size to those of *Digitalis purpurea*. *Seed* ripens in September and October.

*Stem* scarcely any, but several, rather succulent, smooth branches, with swelled joints, from which the fibrous roots issue. *Leaves* opposite, or nearly so, short, fleshy, petioled, lanceolar, acuminate, with the margins more or less curled, of a firm, fleshy, and veinless substance, from four to six inches long, by one broad. *Umbellets* terminal, solitary, sessile, simple, many-flowered. *Flowers* large, drooping; *colour*, a beautiful mixture of orange and crimson. *Bractes* an oblong cadu-

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cous one at the base of each pedicel. *Calyx* tubular, somewhat *gibbous*; *mouth* five-parted. *Corol* tubular, curved. *Tube* somewhat ventricose, villous on the outside; *mouth* oblique, and divided into five, nearly equal, semicircular segments, one above and two on each side. *Filaments* four, didynamous, extend beyond the mouth of the tube. *Anthers* linear, *apices* united. *Germ* superior, linear, smooth; *base* embraced by a nectarial ring, four-celled; *ovula* numerous, attached to the incurved margins of the partitions. *Style*, the length of the germ, or more protruded beyond the anther. *Stigma* entire, fleshy, sub-infundibuliform. *Capsule* siliquose, pendulous, long and very slender, being about twelve inches long, and scarcely so thick as a quill, smooth and brown, with a groove on the opposite sides, four-celled, two-valved. *Valves* thin, almost membranaceous. *Seeds* numerous, minute, imbricated, cylindric, rough, from the apex two long rows and from the base one, they are attached to the rolled-in edges of the valves of the capsule, as in the germ. *Perisperm* none. *Embryo* cylindric, inverse. *Cotyledons* oblong, not half the length of the whole embryo. *Radicle* cylindric, superior; when vegetation begins, the structure of the parts becomes evident, the apex of the radicle first projects, from which innumerable, minute rays issue, and lay hold of the soil, or rather bark of the tree, they are sown on, as is the case in other parasites.

2. I. *oblongifolia. R.*

Shrubby, downy. *Leaves* opposite, unequally ovate-oblong, acuminate, downy, serrulate. *Cymes* axillary.

Common in moist vallies in the province of Chittagong. Flowers in October, and the seed ripens during the cool season. It is rather a small shrub, with thick, somewhat four-cornered, very tomentose branches.

*Leaves* opposite or tern, long-petioled, from six to twelve inches long, villous, one side broader, and running further down on the petiole. *Peduncles* axillary, solitary, dichoto-



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mous, with a flower in the fork; *divisions* from three to six-flowered, all very villous. *Flowers* large, like those of *Martinia diandra; colour* a mixture of whitish red, tinged with yellow. One pair of the *filaments* slender, and abortive; the other thick and villous, with large, two-lobed anthers, without any thing like a spur, or arista. The capsules are not above one-third, or one-fourth the length of I. *parasitica*, but rather thicker; and the seeds are flat and winged with a membranaceous margin all round.

*PEDALIUM. Schreb. gen. N.* 1067.

*Calyx* five-parted. *Corol* sub-equal, with border five-cleft. *Nut* corky, four-cornered, thorny on the angles, two-celled. *Seeds* two-fold.

P. *murex. Willd.* iii. 401.

*Teling.* Yeanaga-pabiar.

Cuca-mullu. *Rheed. Mal.* x. *t.* 72.

*Tam.* Anci-nerunshil.

A pretty large, succulent, ramous, annual plant, growing every where, but chiefly near the sea on the coast of Coromandel, where there is a tolerably moist, sandy soil, which it delights in. Flowering time, the rainy and cold seasons.

*Root* annual, ramous, of a deep orange colour. *Stem* scarcely any. *Branches* nearly opposite, spreading, with their extremities erect, round, and smooth; from six to twenty-four inches long. *Leaves* opposite, petioled, oval, irregularly dentate, truncate, three-nerved, pretty smooth; from two to three inches long, by one and a half or two inches broad. *Petioles* channelled, about two inches long. *Flowers* axillary, short-peduncled, single, pretty large, yellow, erect; on each side of their insertion, is a small, round, brown gland. *Bractes* no other than the above-mentioned glands.

All that I can add to the description in the *Genera plan-*

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*tarum*, is, that between the fertile stamens, there is a short fifth filament, with a sterile, orange-coloured head.

The plant, when fresh, has the singular property of rendering water, or milk, either cold or hot mucilaginous; more or less so in proportion to the quantity of the plant used, and without altering the taste, colour or smell of the liquid. This effect goes off in the course of eight or twelve hours, leaving the liquid in its former state. Water rendered mucilaginous by this herb is sweetened with sugar, and given when fresh made, as a ptisan for the heat of urine in gonorrhœas by the natives on the coast of Coromandel.

Butter-milk is often sold in the markets in India, and in order to make a greater profit on their merchandize, they dilute it with water, and then thicken the whole by turning it round a few times with a few fresh leafy branches of this plant, which makes the adulterated butter-milk seem rich, and of the best sort.

### *CYRILLA. L. Herit.*

*Calyx* five-leaved, or five-parted. *Corol* declined, funnel-formed; *border* five-parted, nearly equal. *Capsule* two-celled, many-seeded.

C. *aquatica. Corom. pl.* ii. *N.* 189.

Annual. *Leaves* verticelled, lanceolate, three or more nerved, serrate. *Racemes* terminal, recurvate.

*Teling.* Bagga-pattee.

A very beautiful and uncommonly curious plant, a native of the borders of pools, &c. of standing water, appearing and flowering in the wet and cold seasons.

*Root* creeping, annual. *Stems* erect, one or two feet high, round, jointed, a little hairy. *Leaves*, the lower ones, and they are generally under water, verticelled, number in the verticel uncertain, pinnatifid; *division* filiform, above water they are three-fold, sessile, broad-lanceolate, from three to seven-nerved, serrate, smooth. *Racemes* terminal, drooping, verticelled, many-flowered. *Bractes* three-fold, cordate, or



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like the leaves, but smaller, one-flowered. *Flowers* large, of a beautiful bluish colour. *Corol* sub-campanulate. *Anthers*, both pairs double, and connected.

The plant possesses a considerable share of fragrance.

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# CLASS XV.

## TETRADYNAMIA SILICULOSA.

*LEPIDIUM. Schreb. gen. N.* 1077.

*Silicle* emarginate, cordate, many-seeded. *Valves* keeled, contrary.

1. L. *Thlaspi. R.*

Annual, erect. *Primary leaves* sub-petioled, superior, with stem-clasping, sagittate base, all more or less cuneate, lanceolate, and remotely serrate. *Flowers* tetradynamous. *Silicles* round, with a broad thin border.

A native of Nepal in corn fields, during the cool season.

2. L. *sativum. Willd.* iii. 435.

*Flowers* tetradynamous. *Leaves* oblong, multifid.

*Pers.* Seereezak.

*Beng.* Halim.

*Arab.* Reshad.

Universally cultivated inthe warmer parts of Asia, during the cool season.

## TETRADYNAMIA SILIQUOSA.

*BRASSICA. Schreb. gen. N.* 1096.

*Calyx* erect, converging. *Seeds* globular. A gland between the shorter stamens and pistil, and between the longer and the calyx.

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1. B. *Rapa. Willd.* iii. 548.

*Root* caulescent, depressed, fleshy.

*Pers.* Shillum.

*Arab.* Subjum.

*Beng.* Shalgum.

Is very generally cultivated in Persia, and most parts of India, during the dry season, from October until March.

2. B. *oleracea. Willd.* iii. 548.

*Root* caulescent, columnar, fleshy. Common cabbage.

*Arab.* Kermub.

*Pers.* Ghellum or Kellum.

*Beng.* and *Hind.* Kobee.

Found in a cultivated state only, probably a native of Persia and the western parts of Asia.

3. B. *erucoides.*

*Leaves* lyrate. *Racemes* very long. *Siliques* clavate, pressed, every part of the plant smooth.

*Beng.* Shwet, or Suffet shursi. Cultivated during the cool season for the seed, from which oil is procured by expression.

*SINAPIS. Schreb. gen. N.* 1087.

*Calyx* expanding. *Claws* of the corol straight. *Glands* between the shorter stamina and pistil, and between the longer and the calyx.

1. S. *dichotoma.*

Dichotomous. *Siliques* cylindric, smooth, spreading; *beak* straight and tapering. *Leaves* stem-clasping, the lower ones somewhat lyrate; the superior, ovate-lanceolate, entire, all smooth, as are also the stem and branches.

*Beng.* Shanchi shurshi, or Sada Rayee.

*Hind.* Soorsun.

A native of Bengal, where it is a cultivated by the natives,

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during the cold season for its seed, from which they express an oil, used by them for various purposes, chiefly to anoint their bodies with.

*Root* almost simple, annual. *Stem* dichotomous, round, and smooth, height of the whole plant in a good soil from two to four feet; its duration about three months, being generally sown in November, and the ripe seed gathered in February. *Leaves* stem-clasping; the *lower* ones lyrate with margins more or less scolloped; the *superior* ones entire, of an obtuse, triangular shape, with broad-cordate, stem-clasping base, all are smooth on both sides, and somewhat fleshy, from two to eight inches long. *Racemes* terminal. *Flowers* numerous, pretty large, bright yellow. *Petals* round. *Stamens* twice the length of the claws of the petals. *Siliques* spreading, almost horizontal, sub-cylindric, smooth, two-celled, from two to three inches long, with a tapering acute beak of from half an inch to an inch in length. *Seeds* small, smooth, of a light brown colour.

2. S. *glauca. R.*

Annual. *Siliques* long-pedicelled, erect, sub-cylindric, smooth, with a long, somewhat clavate beak. *Stem* and *branches* straight, smooth, glaucous. *Leaves* stem-clasping, smooth in every part; the *lower* ones lyrate, the superior ones sub-lanceolate.

*Beng.* Shwet Rai, white mustard.

Cultivated as a field crop in all the northern parts of India during the cold season.

*Root* very ramous, of three or four months duration. The seed time being November, and harvest in February.

*Stem* straight, with many straight scattered branches, all are round, smooth and glaucous, height of the whole plant from three to five feet. *Leaves* stem-clasping, the *lower* and *cauline* ones lyrate, with lobes sub-opposite, obtuse, and nearly triangular, the terminal one nearly round and more or less scollop-toothed; the *superior* or *floral leaves* sub-lanceolate,

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contracted at the middle, with enlarged, cordate, stem-clasping base, all are perfectly smooth on both sides, and glaucous, varying in size from one inch to a foot. *Racemes* terminal. *Pedicels* sub-erect, round, smooth, slender, nearly as long as the full-grown siliques. *Flowers* numerous, of a bright yellow. *Petals* obovate, bright yellow. *Stamens*, the four nearly twice as long as the claws of the petals. *Siliques* long-pedicelled, flattened transversely, smooth, expanding. *Beak* smooth, almost as long as the silique and flattened with a roundish, thick apex. *Seed* numerous, smooth and white, like those of *Sinapis alba.*

The entire seed is used for various economical purposes, an oil is also expressed from it, which is much used in the diet of the Hindoos.

3. S. *ramosa. R.*

Annual, erect, ramous. *Siliques* expanding linear, vertically compressed, smooth. *Leaves* petioled, the *lower* ones lyrate; the *superior* ones sub-lanceolate.

*Beng.* Rayee.

A native of Bengal, where it is cultivated during the cold season. The seed-time being in October, and the harvest in February. The seed and the oil yielded by expression, are useful ingredients in the diet of the Hindoos.

*Root* annual. *Stem* erect, very ramous; *branches* expanding a little, all perfectly smooth, except now and then near the base of the plants, a few soft, white bristles are present; height of the whole plant in a good soil from four to five feet. *Leaves* petioled, the *lower* ones lyrate, in some plants somewhat scabrous, with margins variously serrate-dentate, and often somewhat lobate, towards the top of the plants they are less compound, till at last they are simply lanceolate and smooth, varying in size from an inch to a foot in length. *Petioles* of the lower, or large leaves, round, slightly channelled, and sometimes armed like the bottom of the stem, and large branches, with soft white bristles. *Racemes* terminal; *pe-*

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*dicels* expanding. *Calyx* linear, expanding. *Petals* obovate, bright yellow. *Stamens* longer than the claws of the petals. *Siliques* linear, straight, expanding, from one to two inches long, turgid at the seeds, otherwise smooth, somewhat vertically compressed; beak very short, one-sixth the length of the silique, tapering to a point. *Seed* in each cell, one row, and rather remote, round, dark brown, beautifully rugose.

4. S. *brassicata. Willd.* iii. 555.

Annual. *Radical leaves* long-petioled, obovate, almost entire; the *superior* ones stem-clasping. *Calyx* longer than the claws of the petals; the two shorter stamens nearly hid.

*Chin.* Pak-tsoi.

Is a native of China, from thence the seeds were procured, sent to the Botanic garden by Mr. John Miller.

*Root* in Bengal annual. *Stem* scarcely any, till in blossom, and then the whole plant is uncommonly ramous, and from four to six feet high in our rich soil of Bengal. *Leaves*, the *radical* ones obovate and oval, generally entire, recurved, pretty long, erect, somewhat incurved, smooth, shining, with white petioles, margins waved, sometimes a little lobate, or even lyrate toward the base, smooth on both sides; nerve and veins white like the petioles; *stem* and *floral leaves* stem-clasping, linguiform or lanceolate, obtuse, generally entire. *Inflorescence* as in the common cabbage. *Flowers* numerous, large, of a bright yellow. *Calyx; leaflets* linear, obtuse, concave, rather longer than the claws of the petals. *Stamens* the shorter pair nearly hid within the tube formed by the claws of the petals, with the apices of their anthers recurved, while the apices of the superior four are incurved over the stigma. *Style* rather shorter than the four long stamens. *Siliques* expanding, on pedicels half their length, sub-cylindric, smooth; *beak* one-third their length, tapering. *Seed* round, dark brown, somewhat rugose.

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5. S. *trilocularis. R.*

Annual, erect, ramous, smooth. *Leaves* stem-clasping, the *lower* ones deeply pinnatifid; the *superior* ones linear, and almost entire. *Siliques* smooth, pendulous, three-celled, long taper beaked; seeds white.

From Nepal, where the plant is cultivated, Dr. Buchanan sent seeds to the Botanic garden at Calcutta in 1802, where the plants thrive luxuriantly, and blossom and ripen their seeds during the cold season.

*Stem* annual, erect, smooth, with smooth, erect branches; whole height about three or four feet. *Leaves*, all stem-clasping, the *lower* and *cauline* ones more or less pinnatifid; the *superior* ones linear, and nearly entire, all are somewhat bristle-dentate on the margins, otherwise smooth in every part, and somewhat glaucous. *Racemes* terminal, and axillary. *Flowers* large, erect, yellow. *Siliques* long-pedicelled; immediately after the decay of the flowers, the pedicels become perfectly recurved, and the siliques pendulous; they are all smooth, three-celled, and on that account much larger and broader than those of many other species. *Beak* long, half the length of the pods, taper. *Seeds* numerous, large, round, smooth, white.

6. S. *cuneifolia. R.*

Annual, erect, ramous. *Leaves* petioled, obovate, cuneate, serrate-dentate, with sessile, linear, entire, floral leaves. *Siliques* expanding, smooth, short, subulate, beaked. *Seeds* roundish, chesnut coloured.

The seeds of this species Dr. Buchanan, while in Nepal, received from Thibet, and sent to this garden, where the plants thrive well during the cold season. They blossom in March, and ripen their seed in April.

*Root* annual, large, white and tapering, subfuciform with numerous spreading lateral fibres. *Stem* erect and smooth, with numerous sub-erect, smooth, somewhat glaucous branches; height of the plants in the Botanic garden from four to



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six feet. *Leaves* radical and cauline, petioled, erect, obovate, cuneate, serrate-dentate, slightly rugose, and destitute of pubescence, those about the top of the plant are sessile, linear-lanceolate, recurved, and entire. *Petioles* generally coloured, smooth, nearly round, and deeply channelled. *Racemes* terminal, erect. *Flowers* numerous, small, of a bright yellow. *Calyx* expanding, longer than the claws of the petals. *Petals* with broad claws, and obovate, spreading lamina. *Stamens*, the four larger considerably longer than the claws of the petals. *Siliques* short-peduncled, expanding, linear, obscurely four-sided; beak short and subulate. *Seeds* from ten to twenty in each cell, round oval, obscurely pitted, dark brown.

7. S. *rugosa. R.*

Annual. *Radical* and *cauline leaves* obovate, and rugose, with the *posterior* margin laciniate, and the *anterior* one dentate; nerve very broad, and dividing above the middle like the ribs of a fan; *floral leaves* linear and entire. *Siliques* expanding, torose, short, subulate, beaked. *Seeds* round, chesnut-coloured.

The seeds of this very stately species were sent from Nepal by Dr. Buchanan to this garden, where the plants grow luxuriantly during the cold season, and ripen their seed in March. Dr. Buchanan remarks that he received the seeds from Thibet.

*Stem* scarcely any till the plants begin to blossom, when it shoots up quickly, to four, five, or six feet in height, with an expanding, ramous branch from the axill of each leaf, all round and smooth. *Leaves*, the *radical* ones are petioled, very rugose, and disposed somewhat spirally, which disposition is particularly conspicuous while young; the *cauline leaves* are shorter petioled, or even sessile; the *posterior margins* of both the radical and cauline leaves variously and deeply jagged; the *anterior* margin dentate; the *nerve* is remarkably compressed, ribbed, and broad, armed with a few inoffensive bris-

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tles underneath, and beyond the middle divides like the radii of a fan, which alone readily distinguishes this species while young from all the other sorts I have yet met with. *Floral leaves* linear, and mostly entire. *Racemes* terminal, &c. as in the other species. *Flowers* numerous, bright yellow. *Siliques* short-peduncled, expanding, linear, obscurely four-sided, torose; *beak* short and subulate. *Seeds* from ten to twenty in both cells, small, round, dark brown, pitted.

It approaches nearer to S. *brassicata* than to any other species I am acquainted with. The young plant possesses a warm agreeable taste, and makes excellent sallad.

8. S. *erysimoides. Roxb.*

Annual, erect, with divaricating branches and branchlets. All the leaves petioled, serrate and smooth, from lyrate to pinnatifid, and lastly, linear-lanceolate. *Siliques* short, four-sided, smooth, short-beaked, adpressed to the raceme.

The seeds were sent from Wynaad, a province of Malabar, by Captain Dickinson, to the Botanic garden, where the plants thrive luxuriantly during the cold season; it blossoms in February and March, and the seed ripens soon after.

*Stem* annual, erect, or nearly so; *branches* and *branchlets* numerous, diverging, smooth, often deeply tinged with red, or purple; general height of the whole plant from three to four feet. *Leaves* petioled, serrate and smooth, the larger or inferior are lyrate, with the large terminal lobe thereof deeply and variously divided, advancing upwards they become less and less cut, till at last they are simply lanceolate. *Racemes* terminal, &c. as in the other species. *Petioles* obovate, winged, length of the calyx. *Siliques* short-peduncled, linear, four-sided, torose, smooth, adpressed to the racemes, as in *Sanapis nigra; beak* short, subulate, headed. *Seeds* about eight or twelve in each cell.

9. S. *divaricata. R.*

Annual, erect, angular, with branches divaricate. *Leaves*



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pinnatifid, with winged petioles, embracing the stem. *Pedicels* diverging. *Calyx* as long as the corol. *Siliques* cylindric, smooth, incurved; *seeds* very numerous. *Stigma* sessile.

*Beng.* Bil, or junglee rayee.

A wild species, a native of Bengal, where it appears during the hot and cold seasons, in moist cool places.

*Root* annual. *Stem* erect, furrowed. *Branches* several, nearly as large as the stem itself, issuing from its base, and in luxuriant plants, again furnished with several smaller ones. *Leaves* pinnatifid, with the lobes unequal, and variously dentate, and not very smooth, free from every kind of pubescence, from one to six inches long. *Petioles* winged, and at the base the wings are enlarged into rounded, stem-clasping lobes. *Racemes* shorter than in most other species. *Pedicels* expanding, about a quarter of an inch long, round, smooth. *Flowers* small, yellow. *Petals* cuneate, as long as the calyx only. *Stamens* longer than the corol. *Style* none. *Stigma* sessile on the germ. *Siliques* spreading much, almost diverging, cylindric, smooth, incurved, without beak. *Seeds* very small, and very numerous, brown, rough.

I do not find any use made of this plant or its seed.

10. S. *patens. R.*

Annual. *Siliques* linear, spreading, transversely compressed; *beak* short and tapering. *Leaves* from obovate-cuneate to lanceolate, serrate, smooth. *Stem* and *branches* smooth.

*Beng.* Keel-rayee.

This species is a common weed amongst other small, wild annual plants in gardens, cultivated fields, &c. in the vicinity of Calcutta, where it appears during the rains and blossoms in the cold season.

*Root* annual. *Stem* erect, short, smooth, dividing into numerous, alternate, smooth, expanding branches and branchlets; height of the whole plant from six to eighteen inches. *Leaves* short-petioled, the lower ones from obovate to oblong; *margins* irregular and grossly serrate; the *superior* or narrow-

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er leaves lanceolate and more acutely serrate, all smooth on both sides, from one to six or more inches long. *Racemes* terminal, many-flowered. *Flowers* small, yellow. *Siliques* expanding, linear, transversely compressed, swelled at the seed, but in other respects smooth, crowned with a short tapering, smooth beak. *Seeds* minute, round, smooth, brown.

I cannot learn that the Hindoos make any use of this plant.

H. S. *pusilla. Roxb.*

Annual, erect, ramous. *Siliques* expanding, filiform, smooth; *stigma* sessile. *Leaves* recurvate, with lobes almost entire.

Of what part of India this is a native is to me uncertain, I can only say, that it made its first appearance in the Botanic garden, where earth from the Coromandel coast had been spread; of course, I conclude it is from thence.

*Root* of about three months' duration. *Stem* erect, with a few sub-erect branches of nearly the same length, all round and slightly villous; height of the whole plant about a foot and a half in our rich soil of Bengal. *Leaves* scattered, petioled, between pinnatifid and lobate, with the lobes nearly entire, smooth on both sides, from two to six inches long, and from one to two broad. *Racemes* lengthening. *Flowers* minute, yellow. *Petals* cuneate, scarcely larger, or longer, than the leaflets of the calyx. *Style* scarcely any, but the germ immediately crowned with the large stigma. *Siliques* expanding, filiform, round, slightly protuberant at the seeds, somewhat villous, no beak, but crowned with the remains of the large scabrous stigma. *Seeds* oblong, compressed.

*RAPHANUS. Schreb. gen. N.* 1098.

*Calyx* closed. *Silique* torose, sub-articulate, cylindric. *Glands* one or two between each shorter stamen and pistil, and two between the longer and the calyx.

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R. *sativus. Willd.* iii. 560.

*Siliques* cylindric, torose, two-celled.

*Sans.* Mooluka.

*Beng.* Moola, or Moolee.

*Arab.* Fujl.

The sort cultivated in Bengal is a pale red variety, the root of which grows to the size of a man's leg, or more, and is only half immersed in the soil. It thrives best during the dry season.

*CLEOME. Schreb. gen. N.* 1099.

*Calyx* spreading. *Petals* ascending or regular. *Siliques* dehiscent, one-celled, two-valved.

It is impossible to fix upon any one essential character, that will include the plants of India only, hitherto assigned to this family, some are gynandrous, some polyandrous, some hexandrous, &c. with their corols as much diversified as the stamina.

1. C. *pentaphylla. Willd.* iii. 564.

Annual, erect. *Flowers* gynandrous, hexandrous. *Leaves* quinate and petioled; *floral leaves* ternate and sessile.

Cara-veela. *Rheed. Mal.* ix. *t.* 24.

Cara-vella. *Asiat. Res.* iv. 294.

*Beng.* Kanalla.

*Teling.* Wominta.

An annual plant of from one to three feet high, delighting in gardens and rich cultivated lands.

*Root* ramous. *Stem* erect, except when old, then bent much to one side, round, hairy, winding. *Branches* numerous, two-forked, sometimes coloured on the side most exposed. *young shoots* more hairy, and glutinous. *Leaves* alternate, petioled, digitate. *Leaflets* sessile, unequal, obovate, or broad wedge-formed, somewhat pointed, having both sides clothed with short glutinous hairs, with the margins a little waved, and

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the size very various. *Petioles* channelled, from three to four inches long, frequently armed with small, inoffensive prickles. *Racemes* terminal, long, corymbiform, particularly while young. *Bractes* short-petioled, ternate, numerous, surrounding at regular distances every part of the raceme, those on the lower part sterile, above one-flowered; *leaflets* of the bractes hairy, like those of the leaves, but much smaller. *Flowers* small, white, long-pedicelled, spreading. *Calyx; leaflets* lanceolate, hairy and glutinous. *Petals* erect, affixed between the leaflets of the calyx by five long claws. *Nectary* no other than a swelling at the insertions of the petals. *Stamens* six, ascending, inserted into the pedicel a little above the middle. *Pistil*, pedicel long, ascending, filiform. *Germ* linear. *Stigma* sessile, large, glandular, navelled, perforated. *Silique* long, slender, a little scabrous, diverging. *Seeds* numerous, kidney-formed, black, scabrous.

The taste of the plant is simply herbaceous; its leaves are eaten as an esculent vegetable by the natives in their curries.

2. C. *chelidonii. Willd.* iii. 567.

Annual. *Leaves* digitate. *Calyx* and *corol* regular, polyandrous, with the top of the filaments, clavate. *Siliques* sessile.

*Teling.* Kax, bitter, Woominta.

One of the most common, annual plants all over the Circars, it delights in rice lands, and appears in the greatest plenty immediately after the first rains, during which time the fields are entirely covered with this gaudy elegant plant.

*Stem* annual, straight, ramous, round; from one to three feet high. *Leaves* alternate, petioled, digitate. *Leaflets* from five to nine, wedged, lanceolate, waved, scabrous. *Petioles* longer than the leaflets. *Racemes* terminal. *Flowers* long-pedicelled, large, rose-coloured, remote. *Bractes* single, those of the lower flowers, leaf-like, as the raceme lengthens, becoming more simple. *Calyx* four-leaved; *corol* four-petioled, nearly orbicular, concave, spreading. *Filaments* numerous (about one hundred) with enlarged apices. *An-*

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*thers* linear, recurved. *Germ* sessile, cylindric. *Style*, scarcely any. *Stigma* umbilicated. *Silique* long, slender. *Seeds* scabrous.

The seeds dried and powdered, are used in curries by the natives.

3. C. *viscosa. Willd.* iii. 566.

Annual, erect, hairy, glutinous. *Leaves* digitate; the *floral* ones ternate and sessile; *flowers* polyandrous. *Petals* unilateral.

Aria veela. *Rheed. Mal.* ix. *t.* 23.

Sinapistrim *Zeylanicum, Burm. Zeyl. p.* 2. 15. *t.* 22, although a bad figure, appears to be intended for this plant.

*Beng.* Hoor hooria.

*Teling.* Kuka-wominta.

Annual, a native of cultivated lands. It is more upright, and less ramous than the preceding species, and from one to three feet high.

*Root* descending, almost simple. *Stem* in old plants, smooth; the young stems, and tender branches of old ones are hairy and glutinous. *Leaves* alternate, petioled, digitate. *Leaflets* as in C. *pentaphylla*, only a little more waved round the margin. *Flowers, leaves*, or *bractes* ternate, and much smaller than the others, one-flowered. *Racemes*, if I call all those parts that are covered with the floral leaves, little else remains. *Flowers* solitary, peduncled, erect, yellow, appearing in succession, always at the extremity of the raceme only. *Calyx* spreading. *Corol* as in the family. *Nectary* no other than a large receptacle which receives the calyx, petals, stamens, and pistil. *Filaments* about twenty, ascending, shorter than the petals. *Anthers* after bursting their apices are revolute. *Germ* sessile. *Style* short. *Stigma* oblong, navelled, perforated. *Silique* erect, round, striated, hairy. *Seeds* brown, rough, round, reniform.

This species has a considerable degree of pungency in the taste, but it is not durable on the tongue.

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The seeds are much used by the natives, chiefly the brahmins, in their curries; they are sold in all our bazars, at a very trifling price.

4. C. *diffusa. Roxb.*

Diffuse, annual, hispid. *Leaves* ternate. *Flowers* axillary, solitary, regular, hexandrous. *Siliques* sessile.

A small, spreading, annual species, common on rich cultivated lands, and such as have been lately in culture; it appears and flowers during the rainy and cold seasons.

*Stem* annual, diffuse, ramous, about a foot long, armed with many small inoffensive prickles. *Leaves* alternate, short-petioled, terminate. *Leaflets* wedge-formed, or oblong, glandular, having the middle nerve and margins scabrous, about one half or three quarters of an inch long, and one quarter broad. *Flowers* axillary, solitary, peduncled, small, pale yellow. *Stamens* six. *Germ* sessile. *Style* short, cylindric. *Stigma* umbilicated. *Silique* tapering towards both ends. *Seeds* scabrous.

5. C. *monophylla. Willd.* iii. *p.* 571.

Annual, erect, ramous. *Leaves* simple, lanceolate, cordate, villous. *Flowers* hexandrous.

Tsjeru vela. *Rheed. Mal.* ix. *t.* 34.

Sinapistrum Zeylanicum, &c. *Burm. Zeyl. t.* 10. *f.* 2.

A native of the Coromandel coast, &c. Is in flower during the rainy and cool seasons.

*Root* annual. *Stem* erect, ramous. *Branches* alternate, expanding, round and villous. *Leaves* alternate, entire, soft, with short pellucid hairs; the *inferior* ones petioled, lanceolate-cordate; the *superior* ones floral, sub-sessile, and of a parabolic form. *Stipules* none. *Flowers* pedicelled, small, of a pale pink, solitary on the exterior axills, and on simple terminal racemes. *Bractes* no other than the floral leaf above-mentioned. *Calyx* of four equal, ensiform, erect, hairy, caducous leaflets. *Petals* four, arranged on the upper side, linear-oblong, obtuse, elevated on claws, nearly as long as the lamina. *Filaments* six, ascending, about as long as the



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petals. *Anthers* blue, at first erect, afterwards spirally bent. *Germ* shorter than the filaments, sub-cylindric, hairy. *Styles* scarcely any. *Stigma* broad, somewhat rough. *Silique* long, slender, slightly incurvate, cylindric, acute, a little hairy. *Seeds* numerous, round, rugose.

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# CLASS XVI.

## MONADELPHIA PENTANDRIA.

*AEGICERAS. Schreb. gen. N.* 398.

*Calyx* beneath five-leaved. *Corol* one-petalled, contorted. *Style* single. *Capsule* curved, without perisperm.

A. *majus. Gært. Sem.* i. *t.* 46. 1. *Linn. sp. pl. ed. Willd.* i. 1082.
*Leaves* obovate-oblong, smooth. *Flowers* umbelled.
*Beng.* Hulsee.
Rhizophora corniculata. *Linn. sp. pl.* 635.
Pou Candel. *Rheed. Mal.* vi. *t.* 36. good. Rumphius's figure, if of this, is too bad to be quoted.

A small tree, a native of the Delta of the Ganges, and such other places as are overflowed at spring-tides. Flowering time, the hot season.

*Leaves* from alternate to nearly verticelled, short-petioled, obovate, and wedge-shaped, often emarginate, smooth, entire, firm and fleshy; two or three inches long, and from one to two broad. *Peduncles* terminal and axillary, solitary, very short, collecting round their apices in an umbel of numerous, straight, one-flowered pedicels. *Calyx* five-leaved, much contorted, permanent. *Corol* one-petalled. *Tube* short, gibbous; *mouth* woolly. *Border* five-parted; *divisions* contorted, tapering from cordate bases to short points; soon after expansion they become reflected. *Filaments* five, coalesced into a tube round the germ, inserted into the bottom of the tube of the corol, very woolly. *Anthers* long, incum-

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bent. *Germ* ovate. *Style* longer than the stamens, tapering. *Stigma* acute. *Capsule* horn-shaped, much pointed, smooth, one-celled, one-valved. *Seed* solitary, filling the capsule.

*PISTIA. Schreb. gen. N.* 1112.

*Calyx* inferior, irregular, one-leaved, spathaceous; *tube* obliquely campanulate; *border* crowded, bearing the stamina on its centre. *Corol* none. *Germ* semi-supera, one-celled; many-seeded; *attachment* unilateral. *Style* single. *Capsules* one-celled, many-seeded. *Embryo* in the apex of the ample perisperm.

P. *stratiotes. Willd.* iii. 690.
Tala indica. *Lourier. Cochin Ch.* 492.
*Sans.* Koombhika.
Kodda-pail. *Rheed. Mal.* xi. *t.* 32.
Plantago aquatica. *Rumph. Amb.* vi. *t.* 74.
*Teling.* Neeroo boodookee.
*Hind.* and *Beng.* Taka panna.

Found swimming on pools of stagnant water in most parts of India, having much the appearance of half-grown Lettuce plants. Flowering time the hot season, seed ripens after the rains.

*Root* consists of numerous, long, tapering, hairy fibres. *Leaves* radical, sessile, between obcordate and triangular; having the *exterior* margin scolloped, with many elevated ridges running lengthways underneath; downy on both sides. *Gemmation* or *stoles* from the base of the united leaves. *Flowers* short-peduncled from the centre of the leaves, few and in succession, small, pale-yellow, the structure uncommon and beautiful in the extreme. *Calyx* inferior, one-leaved, tubular, irregular. *Tube* obliquely bell-shaped, woolly on the outside; a crescent-shaped, fleshy, yellow gland, or *lower nectary*, on the centre of the inside, opposite to the stig-



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ma. *Border* cordate, woolly on the outside; *margins* a little waved; on its middle there is a green, fleshy, crenulate, saucer-shaped body, or *upper nectary*, from the centre of which rises the antheriferous column. *Stamina; filaments* single, from the centre of the upper nectary of the border of the calyx. *Anthers* five, adjoined to the enlarged apex of the short filament.

*Note.* This part of the fructification is in no respect situated as in the class *Gynandria*, for which reason I have removed it to *Monadelphia*. *Germ* superior, ovate, one-celled, containing many ovula attached to the interior side of the cell, which is there thick. *Style* short, sightly curved, ovate toward the stamina. *Stigma* somewhat peltate. *Capsule* beaked, one-celled. *Seeds* a few, oval, rugose, affixed to a longitudinal receptacle on the inside of the base of the capsules, which from its oblique situation appears to be its back part. *Embryo* obovate, lodged in the apex of an ample perisperm.

### *MODECCA. R.*

*Calyx* tubular, coloured, five-parted. *Petals* five; inserted on the calyx. *Nectary* various. *Germ* pedicelled, one-celled; *ovula* many; *attachment* parietal. *Capsule* one-celled, three-valved. *Seeds* many. *Embryo* inferior, centrifugal, and furnished with a perisperm.

I have adopted Van Rheed's name for a generic one to this family, which though nearly allied to *Passiflora*, seems sufficiently distinct on account of its capsular seed-vessel and monoicous habit.

1. M. *trilobata. R.*

*Leaves* three-lobed, with a gland under each sinus and two at the base. *Capsules* oblong.

Akund-Phul, the vernacular name in Chittagong, where the plant is found in the moist forests growing to an extent

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of many fathoms; ramous, and climbing up and over trees of a large size.

In the Botanic garden it grows slowly, though healthy; flowers during the rains, and the fruit ripens in October.

*Bark* on the old ligneous parts ash-coloured; on the young shoots smooth, polished, green. *Leaves* remote, alternate, petioled, smooth on both sides, three-lobed, with the *lobes* entire, tapering and acute. *Glands* a large yellow one under each sinus and two at the base. *Petioles* nearly as long as the leaves, columnar, smooth, base permanent, though not enlarged, as in M. *tuberosa*, and becoming a recurved, blunt, short thorn. *Tendrils*, axillary floriferous; when not floriferous, simple. *Flowers* numerous, male and female, mixed on the same tendril, middling-sized, forming a little dichotomous corymb toward the apex of the tendrils. *Calyx* tubular, somewhat gibbous towards the base; *colour* pale yellow; *mouth* five-parted. *Petals* five, linear-lanceolate, ciliate, inserted on the tube of the calyx, near the base. *Nectarial* scales, on the *male* none, on the *female* ten; five are alternate with the petals, entire, and truncated, and five under the petals smaller and ciliate. *Filaments* in the male, five united into a tube. *Anthers* linear, erect. *Germ* in the male a small three-cleft gland, in the *female* short-pedicelled, oblong, one-celled; *ovula* many, attached to three ventrical parietal receptacles. *Style* none. *Stigma* three-lobed. *Capsule* pedicelled, berried, oblong, of the size of a pullet's egg, fleshy, smooth, polished, of a scarlet colour, three-valved, opening from the apex. *Seeds* many, attached by very thick, soft, fleshy cords, to a thickened ridge, down the middle of each valve, obcordate, inversed in a completely soft lucid aril. *Integuments* two; the *exterior* one nuciform, dark-coloured, scrobiculate; the *interior* one membranaceous. *Perisperm* conform to the seed, somewhat glaucous. *Embryo* nearly as large as the perisperm, with round, three-nerved cotyledons, and the radicle lodged at the umbilicus of the seed.

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2. M. *tuberosa. R.*

*Leaves* three, rarely five-lobed; *lobes* sub-lanceolar, apex of the petioles with two glands and one (or an eye) under each sinus. *Capsules* globular.

Modecca. *Rheed. Mal.* viii. *t.* 20.

A most extensive, perennial, climbing plant, with large, fusiform root, a considerable portion of which is above ground, tapering from the surface of the earth, into the stem, which in a few years becomes ligneous; *younger shoots* cylindric and smooth. From Cochin it was introduced by Mr. M. Brown into the Botanic garden at Calcutta, where it blossoms during the rainy season.

*Leaves* alternate, petioled, when the plants are very young simply cordate, often from three to five-lobed (palmate,) but three is by far the most common; *lobes* entire, sub-lanceolate, smooth, rather acuminate; general size from six to eight inches each way. *Glands*, a large yellow one under each sinus and two on the base where it joins the petiole. *Petioles* considerably shorter than the leaves; *base* enlarged into a horn-shaped process on each side, this portion is permanent. *Stipules* none. *Tendrils* springing from the inside of the large permanent base of the petioles, when not floriferous, simple. *Flowers* pretty large, short-pedicelled, and generally from a small dichotomous corymb on the middle of the tendril. *Calyx* one-leaved, coloured, greenish yellow, of a short, sub-campanulate form, with a short five-parted border. *Petals* five, linear; the *upper half* ciliate, inserted on the tube of the calyx, near its bottom, the whole hid within it. *Nectarial scales* five, alternate with the petals, vaulted, and serving to confine the five anthers. *Filaments* five, their base united into a ring round the base of the pedicel of the germ, and about as long as its pedicels, recurved. *Anthers* small, roundish. I suspect there are male flowers which I have not yet seen, with more perfect anthers. *Germ* superior, short-pedicelled, oval, one-celled; *ovula* numerous, attached to three vertical, parietal receptacles. *Styles* three, re-

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curved. *Stigmas* large, globular. *Capsule* pedicelled, globular, fleshy even when ripe, of a bright glossy yellow, and the size of a crab-apple, one-celled, three-valved, open from the apex. *Seeds* many, attached as in the germ, by short cords, obliquely cordate. *Aril* a laciniate, white membrane, round the base only.

3. M. *dubia. R.*

*Leaves* ovate-oblong, entire, or slightly sub-lobate; two glands at the base.

A native of Sumatra, from thence introduced by Dr. C. Campbell, into the Botanic garden at Calcutta, where one male plant blossomed in February 1808.

*Stem* and *branches* shrubby, climbing to an extent of some fathoms. *Bark* of the ligneous plants ash-coloured; that of the young shoots smooth and green. *Leaves* alternate, petioled, oblong, obtuse-pointed; some of them slightly three-lobed toward the apex, smooth on both sides, having at the base a large yellow gland on each side, from three to four inches long, and from one and a half to two inches broad. *Petioles* axillary, about an inch long, channelled. *Tendrils* axillary, simple, with two lateral lobes; at the season of flowering, these lobes lengthen into stout, one-flowered peduncles. *Flowers* axillary, pedicelled, small, of a pale greenish yellow, three together on a very short common peduncle, or in pairs from the just mentioned lobes of the tendrils. *Calyx* one-leaved. *Tube* gibbous; *mouth* five-cleft. *Segments* oblong, revolute. *Petals* five, inserted into the calyx, a little below the sinuses of its border, lanceolate, and with the segments of the calyx becoming revolute. *Filaments* five, very short, inserted on a small receptacle in the bottom of the calyx. *Anthers* sagittate. *Germ* none, a slender, sub-rotate body, with a two or three-cleft apex in the centre of the stamina is all that presents itself.

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## MONADELPHIA HEXANDRIA.

*CANARIUM. Schreb. gen. N.* 1516.

*Calyx* inferior, three-toothed. *Petals* three. *Germ* superior, three-celled, with two ovula in each; *attachment* sub-superior. *Drupe*, with as far as three one-seeded cells. *Embryo* inverse, without perisperm.

1. C. *bengalense. R.*

*Leaflets* ovate, lanceolate, from six to ten pairs. *Stipules* subulate. *Panicles* sub-axillary, linear. *Drupe* ovate.

An immense forest tree, a native of Silhet and the adjoining mountainous countries north and east of that district; flowers in May and June, and the seed ripens about the beginning of the year. From fissures, or wounds in the bark, a large quantity of a very pure, clear, amber-coloured resin exudes, which soon becomes hard and brittle, and is not unlike *copal*, yet the natives set little or no value on it. It has hitherto, so far as I can learn, been unnoticed by any one else. In the Calcutta bazar, it is only valued at from two to three Rupees, for seven maunds of eighty pounds weight each.

*Trunk* erect, straight, many feet in circumference, the whole tree tall, and uncommonly well furnished. *Young shoots* void of pubescence, except the thin, tender, shooting points, and they are covered with a little rust-coloured, pubescence. *Leaves* alternate, round the ends of the branchlets, unequally pinnate, from twelve to twenty-four inches long. *Leaflets* sub-opposite, from six to ten pairs, from ovate-oblong to lanceolate, firm, entire and smooth, acuminate, from three to six inches long, by from one to two broad; *common petioles* round, and smooth. *Stipules* subulate, clothed with long soft ferrugineous down. *Racemes* solitary, insertion above the axills, sub-panicled, shorter, in flower and fruit all the year round. *Flowers* rather small, but numerous, many of them abortive, male hermaphrodites. *Calyx* inferior, cup-shaped, three-toothed. *Petals* three,

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obovate-oblong, smooth, while in the bud imbricated. *Nectary*, a three-lobed, hairy cup round the lower part of the germ, and within the tube, formed by the filaments. *Filaments* six, united into a tube for half their length. *Anthers* oblong, erect. *Germ* superior, ovate, small, three-celled, with two ovula in each attached to the top of the axis. *Style* short. *Stigma* three-cleft. *Drupe* oblong, size of a large olive, smooth, one-celled. *Pulp* in considerable quantity, firm and yellowish; surface dark purple, covered with bloom like the common plum. *Nut* conform to the drupe, pointed, obscurely three-cornered, with an aril from the apex to the base, runs down each of the three sides or faces, thick and very hard, three-celled, &c. almost exactly as in Gærtner's *Canarium sylvestre*, ii. *p.* 98. *t.* 102. except in the ribs on the three sides, not repesented in his figure. *Seed* one, rarely two, in each cell, oblong. *Integument* single, rather spongy and brown. *Perisperm* none. *Embryo* inverse. *Cotyledons* intricately folded up as represented by Gærtner. *Radicle* superior, oblong.

2. C. *commune. Willd.* iv. 759. *Annals of Botany*, i. 360. *t.* 7. *f.* 2.

*Leaflets* from seven to nine, long-petioled, ovate-oblong, smooth, entire. *Stipules* oval, permanent. *Panicles* terminal.

Canarium vulgare. *Rumph. Amb.* ii. *t.* 47.

A native of the Moluccas, from thence brought to the Botanic garden at Calcutta, but does not thrive, the winters being too cold for it, for in fourteen years the plants are not more than ten feet high, with but five branches, and have not yet blossomed.

3. C. *sylvestre. Willd.* iv. 760.

*Leaflets* from seven to nine, short-petioled, from ovate-oblong to ovate-lanceolate, smooth, entire, acuminate. *Stipules*



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petiolary, sub-orbicular; *petioles* beyond the stipules columnar, below them channelled.

Pimela nigra. *Lour. Cochin Ch.* 495. See *Rumph. Amb.* ii. 155. *t.* 49.

Canarium *Pimela. Annals of Botany*, i. *p.* 361.

In its native soil, the Molucca Islands, it grows to be a large handsome tree. In the Botanic garden at Calcutta, where it has been for fourteen years, it is not more than ten or twelve feet high, with a distinct, straight trunk, covered with smooth, ash-coloured bark, the *crown* or *corona* regular, ample and very leafy. The *stipules* clearly mark this species. They are opposite and inserted on the common petiole, nearly an inch above its base; when they fall, they leave two permanent, glandular marks behind.

4. C. *nigrum. R.*

*Leaflets* generally oblong, pointed, somewhat hairy. *Stipules* scarcely any. *Male flowers* on axillary, compound racemes.

*Dulcamara nigra. Rumph. Amb.* ii. 162. *t.* 52 and 53.

Small trees in the Botanic garden brought from Amboyna, began in the month of May to produce male flowers, when they were ten years old.

5. C. *strictum.*

*Leaves* hairy, *leaflets* from nine to fifteen, petioled, sub-opposite, from ovate to ovate-lanceolate, acuminate, afterwards serrulate-ciliate. *Stipules* subulate.

A native of Tinevelly, from thence introduced into the Botanic garden at Calcutta, where the young trees from the seed are twenty or twenty-five feet high, straight, and without a single branch. The trunk tapers like a fishing-rod but is stout, and covered with ash-coloured bark, while the tender parts are densely clothed with ferruginous, short pubescence. The *leaves* from three to four feet long, and the leaf-

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lets about a foot by six inches broad. They are also hairy, particularly while young.

## MONADELPHIA DECANDRIA.

### *MELOCHIA. Schreb. gen. N.* 1110.

*Calyx* somewhat double. *Petals* five, spreading. *Filaments* subulate. *Styles* five. *Capsules* five-celled, with a single seed in each.

1. M. *corchorifolia. Willd.* iii. 604.
M. *corchorifolia. Dill. Elth. t.* 176. *f.* 217.
*Beng.* Tiki-okra.
Tsjeru uren. *Rheed. Mal.* ix. *t.* 73. bad.

Perennial, ramous. *Leaves* sub-cordate, plaited, crenulate. *Flowers* crowded into sub-sessile, terminal heads, intermixed with subulate bractes.

Common every where all over India. Flowers and ripens its seed during the rainy and cold seasons.

### *CONNARUS. Schreb. gen. N.* 1116.

*Calyx* five-parted. *Corol* five-petalled. *Style* single. *Germ* one-celled, from one to two-seeded ; *attachment* sub-inferior. *Capsule* superior, one-celled, two-valved, one-seeded. *Embryo* inverse, without perisperm.

1. C. *paniculatus. R.*

Arboreous. *Leaves* pinnate; *leaflets* five or seven, ovate, oblong, obtusely acuminate, glossy. *Panicles* terminal and axillary ; *flowers* decandrous; *petals* linear (without bristles at the base.)

A large timber tree, a native of Chittagong, where it blossoms in June.

*Young shoots* clothed with a little ferruginous down.



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*Leaves* alternate, unequally-pinnate, about twelve inches long. *Leaflets* five or seven, rarely three, the pairs sub-opposite, ovate-oblong, entire, obtuse-pointed; smooth and glossy, from three to six inches long, and from one to two broad. *Petioles* round and smooth. *Panicles* terminal, and generally a smaller one in many of the exterior axills, large, diffuse, and clothed with rust-coloured pubescence. *Bractes* small, caducous, villous, like the rest of the panicle. *Calyx* five-leaved; *leaflets* oblong, concave. *Petals* five, alternate with the leaflets of the calyx, and larger, linearly-lanceolar, yellow, entire, nothing like a bristle or hair from any part, hence I conclude it cannot be Willdenow's C. *pinnatus*. *Filaments* ten, united at the base, alternately as long as the style. *Anthers* cordate. *Germ* superior, conical, hairy, one celled, containing two ovula, attached a little to one side of the bottom of the cell. *Style* hairy, of the length of the five longest filaments. *Stigma* somewhat headed.

2. *pentandrus. R.*

*Leaves* pinnate; *leaflets* from three to seven, oblong, obtusely acuminate, polished. *Panicle* terminal. *Flowers* pentandrous. *Capsules* polished, obliquely oblong, obtuse.

*Hind.* Moolseree; Toog, about Silhet, where the tree is indigenous; blossoms during the hot season, and the seeds ripen in September.

## MONADELPHIA DODECANDRIA.

### *KLEINHOVEA. Schreb. gen. N.* 827.

*Calyx* five-leaved. *Corol* five-petalled, irregular. *Column* of the fructification, clavate. *Staminiferous tube* five-cleft, each division supporting about three anthers. *Germ* superior, five-celled; *cells* few-seeded; *attachment* interior. *Capsule* superior, inflated, five celled. *Seed* solitary. *Embryo* sub-erect, with a scanty perisperm.

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K. *hospita. Willd.* ii. 871.

Batti-marus. *Rumph. Amb.* iii. *p.* 177. *f.* 113.

This tree was introduced into the Botanic garden from the Moluccas, in 1798. In ten years, they have grown to be trees of a large size, and blossom in September.

*Trunk* very straight. *Bark* smooth, ash-coloured. *Branches* numerous, spreading in every direction. The wood is white and soft. *Leaves* alternate, petioled, broad-cordate, from three to five-nerved, entire, acuminate, of a very thin texture and smooth on both sides, from six to twelve inches long. *Petioles* nearly as long as the leaves, round, smooth. *Stipules* ensiform. *Panicles* terminal, roundish, ovate, large, and very ramous. *Bractes* ensiform, numerous, involucre-like, at the divisions of the panicles. *Flowers* very numerous, pretty large, of a pale, but lively rose-colour. *Calyx* five-leaved; *leaflets* lanceolate, villous, nearly equal, almost twice the length of the corol. *Petals* five, unequal. The upper one incumbent, sub-cylindric, perforated lengthways. The next pair oblong, concave, pressing on the column of fructification laterally. Lower pair also oblong, but expanding more; all are inserted into the base of the column. *Nectary*, a five-lobed ring round the base of the receptacle just within the insertion of the petals. *Filaments* five, broad, fleshy, inserted on the apex of the column round the germ, each slightly three-parted; a slender, short, sterile filament, between each of the large three cleft ones. *Anthers* fifteen pairs, one on each division of the five filaments. *Germ* superior, ovate, hairy, inserted on the apex of the declined, clavate column, which is rather longer than the petals. *Style* longer than the stamens. *Stigma* of five acute points. *Capsule* inflated, membranaceous, turbinate, five lobed, five-celled, five-valved. *Seed* a single, small, round, tubercled one in each cell, attached to the middle of the inner margin of the partitions, obovate, somewhat tubercled. *Integuments* two. *Perisperm* thin, of a firm, tough, fleshy texture and pearl gray colour. *Embryo* conform to the seed, curved, pale

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yellow. *Cotyledons* chrysoloide, contorted, triplicate. *Radicle* inferior, curved, with its apex immediately to the umbilicus. In fact it is a *Malvaceæ*, but with a real perisperm.

*HERITIERA. Hort. Kew.* iii. 546.

*Hermaphrodite* and *male* flowers on the same individual. Hermaphrodite. *Calyx* campanulate, five-toothed. *Corol* none. *Stamens* five pairs. *Germs* five, one-celled, one-seeded; *attachment* interior. *Drupes* from one to five, keel-winged, one-seeded. *Embryo* centripetal, no perisperm.

1. H. *minor. R.*

*Leaves* broad-lanceolate, cinereous underneath. *Drupes* obovate, flattened, inside furrowed, outside keel-winged.

*Balanopteris minor. Gært. Sem.* ii. *t.* 98. *f.* 2.

Heritiera fomes. *Buch. in Symes' Ava. Willd.* v. 372.

Atunus littoria. *Rumph. Amb.* iii. *t.* 63.

*Hind.* and *Beng.* Shoondree, or Sundra.

Samandara. *Linn. Flor. Zeyl.* 433.

A native of the lower parts of the Delta of the Ganges, where it grows to be a large tree. Flowering time the hot season.

*Trunk* straight, often deeply sulcated. *Bark* slightly cracked. *Leaves* alternate, short-petioled, oblong-lanceolar, entire, smooth, of a deep green above, cinereous underneath, from four to six inches long. *Panicles* axillary, shorter than the leaves, crowded, rust-coloured. *Flowers* numerous, small, of a dull orange colour.

2. H. *littoralis. Willd.* vi. 972.

*Leaves* oblong. *Drupes* oval, inside keeled, outside winged.

Balanopteris Tothila. *Gært. Sem.* ii. *t.* 99.

Nagam. *Rheed. Mal.* vi. *t.* 21.

A native of Malabar, Mauritius, &c.

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*HELICTERES. Schreb. gen. N.* 734.

*Calyx* tubular, five-toothed. *Corol* of five unequal petals. *Column* of fructification clavate. *Capsules* five, leguminous, often twisted, one-celled, one-valved. *Seeds* many.

1. H. *Isora. Willd.* iii. 721.

Arboreous. *Leaves* bifarious, cuneate, obovate, sub-lobate, serrate, tomentose. *Capsules* twisted, fine-pointed.

Isora (rather *Iswara*) Murri. *Rheed. Mal.* iv. *t.* 30.

Ki-walla-nara of the Malabars of Wynaad.

This small thinly branched tree is very common in most forests over India, where it blossoms during the rains and cold season.

*Leaves* alternate, bifarious, short-petioled, cuneate-obovate, acuminate, from three to five-nerved, serrate; towards the apex generally somewhat lobate, very downy. *Stipules* subulate, hairy. *Flowers* axillary, several, viz. from four to eight together, generally two or three on a common peduncle, with proper pedicels, rather longer than the peduncles. *Bractes* small, hairy, subulate. *Calyx* one-leaved, hairy; *tube* somewhat gibbous, laterally compressed; *mouth* bilabiate; the *upper lip* emarginate, the *under* one three-toothed. *Corol* five-petalled, all have long, taper claws, which at the mouth of the calyx enlarge into wings, and there embrace the pedicel or receptacle of the nectary, stamina and pistillum. *Lamina* linguiform, with their apices retuse. The upper three are only about one third the breadth of the lower two. When they first expand, the colour is a pretty bright red, but gradually becomes paler, and are nearly lead-coloured by the second day. *Nectary*, or abortive filaments, five emarginate *scales* within the staminiferous tube, and inserted into its base. *Filaments* ten, short, half-way up united into a tube round the germ. *Anthers* ovate. *Pistil; receptacles* at the base, filiform; above the calyx and cord clavate; at the apex enlarged and curved up, at nearly right angles. *Germ*

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conical, five-lobed. *Style* single, twice the length of the stamina, at the base five grooved, curved. *Stigma* simple, acute. *Capsules* five, much twisted, fine-pointed, villous, one-celled, one-valved. *Seeds* numerous, in one row, angular.

*STERCULIA. Schreb. gen. N.* 828.

Monœcous or polygamous. *Calyx* inferior, five-parted. *Corol* none. *Column* of fructification and *staminiferous tube*, various. *Germs* five, one-celled, many-seeded; *attachment* interior. *Capsules* leguminous, from one to five, distinct. *Seeds* few. *Embryo* various, with or without perisperm.

1. S. *Balanghas. Willd.* ii. 872.

*Leaves* oblong, entire, smooth. *Panicles* pendulous. *Follicles* oval, villous.

*Chin.* Pim-pho.

Cavalum. *Rheed. Mal.* ii. *t.* 49.

Found in gardens about Calcutta, where it grows to be a pretty large tree, with a very ramous head.

*Bark* brown, pretty smooth. Flowering time April; *seed* ripens in July. *Leaves* alternate, about the extremities of the branchlets petioled, oblong, smooth on both sides, entire, from two to twelve inches long. *Petioles* round, thick at each end, about one inch long. *Stipules* none. *Panicles* axillary, generally solitary, pendulous. *Peduncles* and *pedicels* coloured, slender, a little downy. *Flowers* numerous, small, pendulous, flesh-coloured, faintly fragrant. MALE. *Calyx* or *corol*, for there is but one, one-leaved, a little hairy, campanulate, five-parted; *divisions* long, slender; *margins* revolute, converging at the points, gaping wide at the sides. *Filaments* (column) single, from the bottom of the bell of the corol, towards the apex recurved, crowded with anthers, too crowded and minute to be distinctly counted. *Hermaphrodite flowers* few, and on the same plant. *Calyx* or *corol* as in the male. *Filaments* many, but very short. *Anthers*

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perfect, surrounding the base of the germ. *Germs* five, very hairy, elevated on a receptacle, surrounding a column, which ends in a style, so much recurved as to bring the five-lobed stigma in contact with the stamens that surround the base of the germ. *Capsules*, from one to five come to maturity, oval, one-celled, one-valved, opening longitudinally on the inside. *Seeds* few, affixed to the gaping sutures. *Integuments* two. The *exterior* one of a dark-chesnut colour, and clammy on the outside; on the inside buff-colour. The *interior* one coriaceous, dull black on the outside, and lined with a light brown tunic within. *Perisperm* none, except a fleshy darker coloured exterior coat of the cotyledons can be so called. *Embryo* the size and shape of the seed. *Cotyledons* thick, of different sizes and shapes. *Radicle* opposite to the umbilicus.

*Note.* The seeds are deemed wholesome, and nearly as palatable as chesnuts when roasted.

2. S. *urens. Willd.* ii. 873. *Roxb. Corom. pl. N.* 24.

*Leaves* round-cordate, five-lobed; *lobes* entire, long, fine-pointed. *Panicles* erect; *calyx* campanulate. *Capsules* armed with sharp bristles.

*Hind.* Bulee.

*Teling.* Kavalee.

A large tree, a native of the mountainous countries on the coast of Coromandel, Hindoostan, &c.

*Leaves* deciduous about the end of the wet season. It flowers during the cold, and the leaves appear with the fruit about the beginning of the hot season. *Trunk* erect, very straight, top large and shady. *Bark* light ash-coloured, very smooth; its outer coat is thin, transparent, covered with a farinaceous substance, and peels off like the exterior pellicle of the birch bark; inwardly it is fibrous, and netted. *Leaves* about the extremities of the branches, alternate, petioled, five-lobed, five-nerved; *lobes* acute, very downy, from nine to twelve inches each way. *Petioles* nearly as long as the leaves, round, downy. *Panicles* terminal, pretty large,



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every part covered with a glutinous, farinaceous, yellow down. *Bractes* lanceolate. *Flowers* small, numerous, yellow, male and hermaphrodite mixed; there is but a small proportion of the latter. *Hermaphrodite calyx* below, campanulate, five-toothed, leathery; *divisions* acute; on the inside of each division near the base, there is an obcordate hairy gland. *Corol* none. *Filaments* ten, alternately longer, united below into a thin sheath, which girds the receptacle of the germs. *Anthers* large, two-lobed, alternately larger. *Germs* five, placed on a thick, short pedicel, as in *Grewia*. *Style* single, short, thick. *Stigma* five-lobed. *Capsules* five, united in the form of a star, one-celled, one-valved, opening lengthways on the inside, covered with yellow down, and many stiff burning hairs. *Seeds* from three to six, oblong, chesnut-coloured, inserted alternately into the margins of the capsules.

MALE. *Calyx; stamens and columnar receptacle* as in the *hermaphrodite*. *Pistillum*, the rudiments of the genus only, without any appearance of a style.

The wood of this tree is soft and spongy, except towards the centre of large trees, where it is reddish. I do not know of any use it is put to, except to make fuel.

I observed, that the water in which I kept the green branches for examination, became thick, like a clean glutinous jelly. *Bark* exceeding astringent, tinges the spittle reddish.

*Note.* This agrees nearly with *Sterculia plantanifolia* of the supplement. The chief difference is, that here the leaves are downy, there very smooth. It yields a gum not unlike *Tragacanth*, and has been sent to London as such, but the artists, who use that gum, did not find it answer. The seeds are roasted and used by the natives as an article of diet, and also as a dainty.

3. S. *colorata. Willd.* ii. 873. *R. Corom. pl.* i. *N.* 25.

*Leaves* five-lobed; *lobes* acute. *Calyces* club-funnel-

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shaped, *mouth* five-toothed. *Follicles* smooth, two-seeded, opening long before the seeds are ripe.

*Teling.* Karaka.

A large tree, a native of the mountainous parts of Rajamundree Circar.

*Leaves* deciduous during the cold season. It flowers in April, soon after the leaves make their appearance, and the seed ripens about the beginning of the rains. *Trunk* erect, growing to a very great size. *Bark* ash-coloured, and a little scabrous. *Branches* numerous, spreading, their bark smoother than on the trunk. *Leaves* alternate, about the extremities of the branchlets, petioled, considerably broader than long, villous, five-lobed, five-nerved; *lobes* acute, soft; the leaves are generally, when full-grown, from nine to twelve inches broad and from six to nine long. *Petioles* round, a little downy, about nine inches long. *Stipules* erect, lanceolate, inserted into the petiole near its base. *Panicles* terminal, small, numerous, red like corol, being covered with much red, stellate pubescence, when in flower the whole tree appears as if covered with numerous ramifications of red corol. *Flowers* numerous, about an inch long. *Calyx* one-leaved. *Tube* clavate, leathery; *mouth* five-toothed, outside covered with red stellate hairs, withering. *Corol* none. *Filaments* scarcely any. *Anthers* about thirty, kidney-formed, sessile round the border of the extremity of the receptacle, cylindric, a little curved, of the length of the calyx, round and smooth, bearing five oval germs on the top, surrounded by the stamina. *Styles* five, short, recurved. *Stigmas* acute. *Capsules*, from one to five come to maturity, pedicelled, pendulous, leathery, smooth, opening on the inside, long before the seeds are ripe. *Seeds*, generally two, adhering one to each margin of the gaping follicle, alternate, about the size and shape of a small field bean.

4. S. *parviflora. R.*

*Leaves* cordate-oblong, acuminate. *Panicles* lateral, di-



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verging. *Tube* of the calyx gibbous, with the apices of its segments united, and the sides gaping.

*Hind.* Ram-julparee.

A middling sized tree, a native of the hills east of Tippera. In flower in March.

5. S. *angustifolia. R.*

*Leaves* lanceolate. *Panicles* lateral, pendulous. *Flowers* globular; segments of the calyx united at the top, gaping at the side.

A middling sized tree, a native of Nepal. It flowers in the Botanic garden in March, when the new foliage begins to appear, the former year's having fallen during the cool season, indeed all the *Sterculias* are deciduous in Bengal.

6. S. *populnifolia. R.*

*Leaves* long-petioled, round, reniform, cordate, acuminate, entire, smooth, from five to seven-nerved.

A tree, a native of Coromandel. The bark is particularly smooth in our young trees.

7. S. *guttata. R.*

*Leaves* oblong, entire, villous underneath. *Racemes* terminal, and from the fork of the branches, simple.

Ramena-pou-maram. *Rheed. Mal.* iv. *t.* 61.

A native of Malabar, from Wynaad Captain Dickenson sent the seeds to the Botanic garden in 1802, and the young trees reared therefrom, blossomed for the first time in December 1809. They were then about twenty feet high, and the trunk twenty-one inches in circumference, four feet above the ground.

*Trunk* straight to the top of the trees. *Bark* considerably cracked, and no doubt in old trees much so; that of the young parts smooth, ash-coloured; *young shoots* clothed with stellate down, inwardly it abounds with very strong, white, flaxen fibres, of which the inhabitants of Wynaad manufacture a

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kind of coarse cloth.* *Petioles* round, downy, from two to three inches long. *Stipules* ensiform, caducous at an early period. *Racemes* terminal, and from the divisions of the branchlets, diverging, simple, clothed with ferruginous stellate pubescence. *Flowers* tern, short-pedicelled, middling sized, inodorous, by far the greater part hermaphrodite. *Bractes* lanceolar, a larger one below the middle flower of the three, and a minute one under each of the other two. *Calyx* nearly rotate, with its five segments revolute, both sides very pubescent; the outer side pale yellow; the inner one beautifully marked with numerous, minute, purple glands on a yellow ground. *Anthers* about a dozen, inserted on the border of the thin nectarial belt which embraces the base of the germ. *Germs* long-pedicelled, globose, from three to five-lobed; three most frequent, downy, from three to five-celled; each cell contains two vertical rows of ovula, attached to the inner angle of the cell. Many of the flowers are abortive, or male-hermaphrodite. *Style*, in the fertile hermaphrodite, retrofracted, nearly as long as the germs; in the male-hermaphrodite scarcely any. *Stigma* from three to five-lobed. *Capsules* from one to five, nearly round, of the size of a small apple, one-celled, one-valved, with the surface furrowed, orange-colour-

* "The bark of this tree, the Malabars convert into a flaxy substance, of which the natives of the lower coasts of Wynaad contrive to make a sort of clothing. It derives its name from the first process of its manufacture, *viz.* the chopping the bark into small pieces, *aurayoonoo,* to cut. It is not customary to manufacture the bark until the tenth year, when its size will be equal to that of most forest trees. The mode of obtaining this flaxy substance is as follows. The tree is felled, the branches lopped off, and the trunk cut into pieces of six feet long, a perpendicular incision made in each piece; the bark opened, and taken off whole, chopped, washed, and dried in the sun. By these means, and without any further process, it is fit for the purpose of clothing."

For the above account we are obliged to Captain Dickenson, of the Bombay Military establishment.

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ed, lined on the inside with a firm, smooth, fibrous, pink-coloured parchment-like membrane; the margins of the opening, and pedicels of the seed very hairy. *Seeds* few, oblong, of the size of a field bean. *Integuments* three; the *exterior* one thin, black and brittle; the *second* thin, light brown and tough; between these two is a soft, white, sebaceous substance; the *inner* integument is membranaceous. *Perisperm* on each side of the embryo amygdaline. *Embryo* straight. *Cotyledons* elliptic, extending completely through the perisperm. *Radicle* small, lodged in the apex of the seed opposite to the umbilicus.

8. S. *lanceæfolia. R.*

*Leaves* lanceolate, entire, smooth. *Racemes* axillary, simple, much shorter than the leaves; *flowers* red, long-pedicelled. *Capsules* oblong, villous, from four to eight-seeded.

Ushlea the vernacular name in Silhet, where it is indigenous, growing to be a middling sized tree. Flowering in March and April, and the seed ripening in May and June.

*Bark* of the trunk and larger branches ash-coloured; *young shoots* slightly villous, I may say smooth, as the little pubescence they have, when very tender, soon rubs off; thus it is also with the leaves. *Leaves* alternate, petioled, lanceolate, rather obtusely acuminate, entire, smooth, from four to eight inches long, by from one to three broad. *Petioles* about an inch long, thick at both ends. *Stipules* thick, subulate, a little hairy, caducous. *Racemes* axillary, or under the leaves, and much shorter than them, simple, erect. *Flowers* few, small, red, long-pedicelled, by far the greater part are male. *Calyx, stamina* and *pistillum* as in the genus. *Capsules* follicular; from one to five come to maturity, they are oblong, rather obtuse; the surface rather harsh with very minute, short hairs; length about three inches. *Seeds* from four to eight, oval. *Integuments* three; the *exterior* one thin, brittle, polished, black; the *second* thin, brown; between it and the exterior one a firm, dull-coloured, soft, sebaceous lamina; the *interior* integument membranaceous, light brown. *Perisperm*

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in rather small quantity. *Embryo* straight, of a pale yellow. *Cotyledons* oval, nearly the size of the perisperm, thick and fleshy. *Radicle* ovate, pointing to the apex of the seed, directly opposite to the umbilicus.

9. S. *coccinea. R.*

*Leaves* lanceolar, entire, smooth. *Panicles* axillary, drooping; *segments* of the calyx expanded, filiform and woolly. *Capsules* oblong, beaked, from four to eight-seeded.

A small tree, a native of Silhet where it blossoms during the hot season, and the seed ripens in May and June. It is conspicuous on account of the spreading, slender, woolly segments of the border of the calyx, and the crimson capsules.

*Young shoots* a little hairy. *Leaves* alternate, petioled, lanceolar, with a rather abrupt base, entire, obtusely acuminate, with a few depressed, stellate, harsh hairs underneath, from four to eight inches long, and from one to three broad. *Petioles* about an inch long, and hairy. *Stipules* subulate, hairy. *Panicles* axillary, and under the leaves, solitary, the length of the leaves, but pendulous; while scarcely expanded, a little hairy. *Flowers* rather long-pedicelled, pretty large, by far the greatest part male, of a greenish yellow colour, tinged with pink. *Bractes* subulate. *Calyx* rather flat; *segments* of the border five, long, slender, and woolly, spreading out in various directions, not converging, with their lips united, as in *Balanghas parviflora*, and *angustifolia*, which also have long slender segments. *Stamina* and *pistillum* as in the other species already described. *Capsules* follicular, from one to five come to maturity, linear-oblong, ending in a sub-cylindric, obtuse, curved beak, villous, both the inner and exterior surfaces of a bright crimson; general length from three to four inches. *Seeds* from four to eight, oval, smooth, of a bright chesnut colour. *Perisperm* in small quantity, and quite divided by the cotyledons. *Embryo* straight. *Radicle* in the apex of the seed directly opposite to the umbilicus.

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10. S. *alata. Roxb.*

*Leaves* cordate, entire, from three to five-nerved. *Racemes* crowded about the ends of the branchlets, length of the petioles. *Follicles* sub-rotund. *Seeds* numerous, winged.

A native of the countries immediately east of Bengal, where it grows to be a large, handsome, very ramous tree. Flowering time, in the Botanic garden, February and March, and the seed ripens about the close of the year. In the province of Chittagong, the tree is called *Buddha Narikella*, which may be translated, *Boodh's Coco-nut*, *Narikella* being one of the Sanscrit names of the *Coco-nut*. In Silhet it is called *Toola*, and there the seeds are said to be eaten by the natives as a cheap substitute for opium.

*Trunk*, in trees twenty-five years old, now growing in the Botanic garden, straight, tall, four feet above the ground, three and a half feet in circumference. *Bark* quite smooth, and ash-coloured. *Branches* numerous, towards the *top* of the tree ascending, *below* divaricate. In its native soil, they arrive at a much greater size; viz. ten feet in circumference, and above one hundred high. *Leaves* alternate about the ends of the branchlets, petioled, cordate, entire, smooth, from three to five-nerved, from four to twelve inches long, and from three to eight broad. Deciduous about the time the blossoms appear in February and March. *Petioles* round, smooth, from one to four inches long. *Stipules* minute, subulate, caducous at a very early period. *Racemes* axillary, sometimes terminal, thin, sub-panicled, but the most common mode is racemes in pairs from the axills of the former years toward the ends of the branchlets, and about as long as the petioles, or more densely clothed with ferruginous stellate pubescence. *Flowers* pretty large, short-pedicelled, reflex; male and female on the same racemes. *Bractes* ensiform, three under each flower, and caducous at a very early period. *Calyx* campanulate, divided nearly to the base, into five thick, fleshy, recurved, lanceolar segments; outside clothed with ferruginous, stellate pubescence; inside ele-

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gantly striated with crimson and yellow. *Corol* none.

Male Flowers. *Column* of the abortive stamina cylindric, much shorter than the calyx, straight. *Filaments* scarcely any. *Anthers* imbricated in five fascicles of about five each, which unite below the middle and form a cup round the five imperfect germs.

Female Hermaphrodite Flowers. *Column* none. *Stamina*, five sessile bundles of imperfect anthers embracing the five grooves of the base of the germs. *Germs* five, singly semi-ovate, one-celled, with two rows of ovula in each, vertically attached to the inner angle of the cell. *Styles* short, recurved, villous. *Stigmas* rather broad and emarginate. *Follicles* or rather *leguminous capsules* from one to five, from the size of a man's fist, to that of an infant's head, nearly round, long-peduncled, one-celled, one-valved; *valve* thick, tough, and very fibrous; *surface* densely clothed with a brownish olive, mealy pubescence. *Seeds* many, attached to the margins of the valve, oblong, considerably compressed, each terminated by a long, broad, spongy wing, (hence the specific name,) which becomes thin and sub-membranaceous at the apex. *Integuments* three; the *exterior* one, a brown, friable, spongy body with a few fibres from the wing; the *middle* or *second* one forms an oval nuciform envelope for the embryo only, and seems composed of three parts; the exterior and interior thin, brown and friable, and the middle part thicker, tough and hard; the *interior* integument a thin membrane. *Perisperm* none. *Embryo; cotyledons* equal, conform to the seed, three-nerved. *Plumula* two-lobed. *Radicle* patelliform, lodged immediately within the umbilicus, relative, centripetal.

11. S. *villosa. R.*

*Leaves* from five to seven-lobed; *lobes* repand, or lobate, firmly acuminate. *Panicles* pendulous. *Follicles* oblong, villous, many-seeded.



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A native of the mountainous countries to the eastward of Bengal. Flowering time, the beginning of the hot season.

*Trunk* straight. *Bark* smooth. *Branches* few, spreading. *Leaves* alternate, petioled, roundish, or cordate-lobate, five-nerved; there are generally from five to seven acute, long-pointed, lobate lobes; when young very downy, particularly underneath, from twelve to eighteen inches each way. *Petioles* round, as long as the leaves, or longer, downy. *Stipules* lanceolate-cordate, downy, caducous. *Panicles* terminal, the longer pendulous, the shorter drooping, or diverging; every part covered with rust-coloured down. *Flowers* numerous, male and hermaphrodite mixed; the former by far the most numerous; all are pretty large; *border* of a pale yellow, or straw-colour, and the bottom of the bell pink. *Bractes* filiform, caducous. *Calyx* campanulate, outside downy.

Hermaphrodite Flowers. *Anthers* ten, two-lobed, inserted on the toothed edge of a membranaceous ring, which surrounds the base of the germs. *Germs* globular, elevated above the base of the corol by a curved cylindric column. *Style* single, the length of the germs, and recurved so much as to bring the five lobed stigma into contact with the anthers. *Capsules* five, or fewer, &c. as in the germs, and covered with soft, rust-coloured down.

Male Flowers. *Calyx* as in the hermaphrodite. *Stamens;* column, as long as the hermaphrodite, style and column taken together, hooked, apex a little enlarged for the reception of ten small twin anthers round its margin, in their centre, consisting of five glands, the representation of a pistil.

12. S. *fœtida. Willd.* ii. 874.

*Leaves* digitate.

Clompanus major. *Rumph. Amb.* iii. *t.* 107. but Karil, *Rheed. Mal.* iv. *t.* 36. is a *Vitex*, and I presume, *leucoxylon.*

S. *fœtida. Sonnerat. Chin.* ii. *p.* 234. *t.* 132.

*Tam.* Kudra-plukku.

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Jungli-b*u*dam, (wild almond) is the name it is known by amongst the Musselmans on the Peninsula.

A tall stout tree, a native of the interior parts of the Peninsula of India. In the Botanic garden it blossoms in March, and the seed ripens about six months afterwards.

*Trunk* tall and straight. *Branches* verticelled, and horizontal. *Bark* ash-coloured, and pretty smooth. *Leaves* crowded about the ends of the branchlets, long-petioled, digitate. *Leaflets* from six to twelve, lanceolar, entire, smooth. They are perfectly deciduous during the cool season in Bengal. *Stipules* ensiform, caducous at an early period. *Racemes* immediately under the young leaves of the present year, horizontal, compound, about as long as the petioles, smooth. *Flowers* large, of a dull crimson and orange, variously blended, most of them male-hermaphrodite. *Bractes* very small. *Calyx* hypocrateriform, deeply five-cleft, deciduous. *Segments* lanceolate, villous on the inside. *Column* of the fructification long, and much curved. In the *male-hermaphrodite* its apex is more enlarged, and forms a campanulate receptacle for the germ, on the margin of which twelve or fifteen anthers sit, and in its bottom the five-lobed abortive germ without style or stigmas. In the *fertile hermaphrodite* it is more robust, with an acetabuliform apex, round its margin are about the same number of anthers. *Germs* round, very villous, five-lobed, five-celled, in each about from twelve to twenty seeds, attached in two vertical rows to the inner angle of the cell. *Style* curved. *Stigmas* five-lobed. *Capsules*, from one to five come to maturity, singly about the size of a man's fist, broad-reniform, pretty smooth, ligneous and fibrous, lined on the inside with a thick parchment-like web of waved transverse fibres; one-celled, one-valved. *Seeds* several, from ten to fifteen, of the size of filberts, oblong, attached alternately to the ligneous margins of the follicle, hard and smooth. *Perisperm* none. *Embryo* inverse. *Cotyledons* conform to the seed, five-nerved, thick and fleshy. *Plumula* two-lobed; *lobes* digitate,



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hairy. *Radicle* ovate, pointing to the end of the seed most remote from the umbilicus.

On the Peninsula, where the tree is indigenous, the seeds are roasted, and eaten like chesnuts, though not much esteemed.

*ABROMA. Schreb. gen. N.* 1217.

*Calyx* five-leaved. *Petals* five, with cucullate base. *Staminiferous tube* five-cleft, the bottom of each fissure bearing three anthers. *Styles* five. *Capsules* five-winged, five-celled, gaping at top. *Seeds* many.

A. *augusta. Willd.* iii. 1424.

Abroma fastuosa. *Gært.* 307. *t.* 64.

*Beng.* Ullat kumul.

Theobroma augusta. *Mill. Illustr.* iii. *p.* 583.

Abroma *Wheeleri. Retz.* v. 27. *Willd.* iii. 1425. is no doubt the same.

Gossipium demonum. *Rumph. Amb.* iv. *t.* 14.

A native of various parts of India, growing to be a small tree. Flowers most profusely during the rains, and the seeds ripen in the cold season. The bark abounds with strong, white fibres, which make a very good substitute for hemp, and as the plant grows so quickly, as to yield two, three, or even four crops of cuttings annually fit for peeling, it may be advantageously cultivated for its fibres, which though not so strong as hemp, make good common cordage, &c.

*DOMBEYA. (Cavan.)*

*Calyx* five-parted, *exterior* bractiform. *Petals* five. *Stamina* twenty, of which five are barren. *Style* five-cleft. *Capsules* five, coloured, one-celled, one or more seeded.

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1. D. *ovula. Cavan. Diss.* iii. *p.* 127. *t.* 41. *f.* 2.

*Leaves* cordate-oblong, obtusely gland-serrate, from three to five-nerved, downy, particularly underneath. *Corymbs* terminal, dichotomous, with the extreme ramifications umbelliferous. Found indigenous on the Mauritius by Colonel Hardwicke, in flower in June and July. All the young parts densely clothed with minute, stellate, ferruginous pubescence.

2. D. *tiliæfolia. Willd.* iii. 725.

Shrubby. *Leaves* from five-angled, and sub-rotund, to cordate, all are serrate. *Stipules* subulate. *Corymbs* axillary, solitary, bifid.

A very handsome, uncommonly scabrous shrub, a native of the Mauritius, from thence sent to the Botanic garden where it throws out most copiously its numerous corymbs of pretty, large, pale, rosy flowers, about the beginning of the cool season. While the plants are young, until the floriferous branchlets appear, the leaves are five-angled; afterwards they become simply cordate.

*PENTAPETES. Schreb. gen. N.* 1122.

*Calyx* double; the *exterior* one three-leaved, caducous; the *interior* one five-parted. *Corol* five-petalled. *Stamens* twenty, of which five are longer and sterile. *Capsule* five-celled, many-seeded; *partition* contrary.

P. *phoenicea. Willd.* iii. 727.

*Leaves* hastate-lanceolate, crenate-serrate.

*Ruktuka*, Bhundhuka, Sanscrit names.

*Beng.* Kat-Lala, Doopahuria.

Naga-pu, *Rheed. Mal.* x. *t.* 56, is evidently this plant, while Sjasmin, *vol.* x. *t.* 1, is *Hibiscus phoeniceus.*

This elegant plant is annual, a native of wet rice-fields. Flowering time, the rainy season.

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*Stem* erect, with many simple, erect branches; when growing on a good soil from two to five feet high, smooth, except for a few small, depressed, stellate hairs. *Leaves* petioled, alternate, hastate, linear-lanceolate; *margins* waved, and deeply serrate-crenate, pretty smooth on both sides. *Petioles* from one to two inches long, round. *Stipules* subulate. *Peduncles* axillary, solitary, short, two-flowered; *pedicels* three times longer than the peduncles, joined near the apex. *Bractes* about the base of the peduncles and pedicels, subulate. *Flowers* nodding, large, bright red, expanding at noon and dropping by day-light next morning. *Calyx* double; the *exterior* one three-leaved, caducous; the *interior* one deeply five-parted; *divisions* lanceolate, bristly. *Petals* five, triangular, inserted by evident sutures into the base of the staminiferous tube. *Stamens* fertile; *filaments* fifteen, short. *Anthers* sub-sagittate. *Sterile filaments* (or *nectaries*,) five, linear-lanceolate, nearly the length of the corol, one between every three fertile filaments, and with them united at the base into a short conical tube. *Germ* half hid in the tube formed by the base of the filaments. *Style* the length of the sterile filaments. *Stigma* clavate, and spirally twisted. *Capsule* sub-globular, bristly, five-celled, five-valved. *Seeds* from eight to twelve in each cell, disposed in two vertical rows.

*PTEROSPERMUM. Schreb. gen. N.* 1124.

*Calyx* five-cleft. *Corol* five-petalled. Five of the twenty stamens, sterile. *Germ* pedicelled, five-celled; *cells* few or many-seeded; *attachment* interior. *Capsule* woody, five-celled. *Seeds* winged. *Embryo* erect, plaited, and furnished with a perisperm.

1. P. *acerifolium. Willd.* iii. 729, &c.
*Leaves* peltate, ovate, repand.
Pentapetes acerifolia. *Linn. Cavan.* &c.

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Kurnikara, the Sanscrit name.

*Beng.* Kunuk-champa.

I cannot say where the tree is indigenous; in Bengal, it is found in the gardens only, and is yet but twenty-five or thirty feet high; but seems to be naturally a very large tree. Flowering time, the beginning of the hot season.

*Trunk* short, tolerably straight. *Branches* spreading, but not near so numerous as in P. *suberifolium*. *Bark* smooth, light ash-coloured. *Leaves* petioled, alternate, bifarious, peltate, oval, repand, when young covered with much stellate down, as is every tender part of the tree, the same as in P. *suberifolium*; when full-grown, upper side is smooth, and the under side remarkably hoary; length from eight to twelve inches. *Petioles* round. *Stipules* many-cleft, caducous. *Peduncles* axillary, very short, one or two-flowered. *Bractes* many-cleft, like the stipules. *Flowers* very large, pure white and fragrant. *Calyx* as in P. *suberifolium*. *Petals* obliquely wedge-shaped. *Stem*, *pistil*, &c. as in the genus. *Germ* as in the ripe fruit, only each of the five cells is nearly divided into two, by a membrane, which is not visible when ripe. *Capsule* ligneous, five-seeded, oblong, fully six inches long and about three in diameter, covered with a coarse dark brown, mealy substance, five-celled, five-valved. *Seeds* about twenty in each cell, attached in two rows to the inner edge of the triangular valves, obliquely oval, compressed; from the upper end, a large brown, membranaceous, thin wing rises. *Integument* single, smooth, brown. *Perisperm* rather gelatinous, in small quantity, entering into the various foldings of the cotyledons. *Embryo* conform to the seed, nearly erect, pure white. *Cotyledons* two, large, very thin, variously folded or wrinkled. *Radicle* cylindric, inferior, its apex immediately opposite to the umbilicus of the seed.

The flowers, like those of P. *suberifolium*, render water gelatinous.

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2. P. *suberifolium. Willd.* iii. 728.

*Leaves* cuneate-oblong, towards the apex repand-dentate.

Pentapetes *suberifolia. Linn. Cavan. &c.*

*Moochukoonda. Asiat. Res.* ii. 349.

*Tam.* Taddo-marum.

*Beng.* *Moochukoonda, Muskunda.*

A native of mountainous tracts all over India. Flowering time the beginning of the hot season.

*Trunk* erect, growing to be a timber tree of middling size. *Branches* numerous in all directions; *young shoots, leaves, petioles, bractes,* and *calyx,* covered with stellate, rust-coloured hairs. *Leaves* alternate, bifarious, short-petioled, cuneate-oblong, repand-dentate round the apex, in some plants deeply lobate, sometimes even peltate and pinnatifid. *Flowers* axillary, short-peduncled, large, pure white, fragrant, something like the best cloves. *Bractes,* from four to six surrounding the base of the calyx, like an inferior perianth, wedge-formed; the exterior half variously and deeply divided. *Calyx* five-leaved; *leaflets* linear, very long, revolute, hairy on the inside. *Petals* obliquely wedge-formed. *Filaments* inserted into a columnar receptacle round the apex of the base of the oblong hairy germ, as in *Grewia. Anthers* a polliniferous groove on each side of the upper third, or fourth part of the filaments. *Germ* elevated on a strong, columnar receptacle, common to it and the stamens. *Capsule* and *seed* as in the germs. The wood is white, and too soft to be of much use.

3. P. *semi-sagittatum. Buch.*

*Leaves* sub-lanceolate, entire, base of the inferior half protruded. *Flowers* terminal, and solitary. *Capsule* oblong-elliptic, densely clothed with stellate pubescence.

Found by Dr. Buchanan at Chittagong, and from thence seeds were sent by him to the Botanic garden at Calcutta in 1797, where the trees grow luxuriantly, and flower about the close of the hot season, ripening their seeds ten months

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afterwards. In twelve years the trees are thirty or forty feet high; thick in proportion, and promise to be larger.

*Trunk* straight. *Young shoots* very downy. *Bark* of the trunk and large branches ash-coloured. *Leaves* alternate, bifarious, short-petioled, spreading, lanceolate, entire, the base of the inferior half of each leaf protruded into a lobe of considerable size, and generally longer than the petiole, smooth above, hoary underneath, about six inches long, and nearly two broad. *Stipules* finely pinnatifid. *Flowers* terminal, and axillary, generally solitary, on short, downy, rust-coloured peduncles, drooping, large, pure white. *Bractes*, or *involucre*, generally three-leaved, and very downy, from three to five-parted, with divisions variously laciniate. *Calyx* five-cleft; *divisions* recurvate, linear, longer than the corol; on the *inside* white, and villous; on the *outside* clothed with brownish, stellate, short hairs. *Corol* sub-campanulate. *Petals* five, obliquely obovate-cuneate. *Filaments* fifteen, with anthers which are shorter than the style, and five abortive ones as long as the style; they are not united at the base, but inserted on the apex of the long sub-cylindrical receptacle, round the base of the germ. *Germ* a little elevated above the stamina, on a short, proper, fleshy receptacle, ovate, downy. *Style* single, filiform, as long as the abortive stamina. *Stigma* clavate. *Capsule* without angles, oblong-elliptic, from two to three inches long, and one and a half in diameter, ligneous, clothed with an immense quantity of brown, stellate pubescence, five-celled, five-valved. *Seeds* about ten in each cell, attached from the lower and inner angle in two rows to the inner edge of the triangular valves, obliquely oval, compressed; from the upper end rises a large, straight, thin, brown, membranaceous wing. *Integument* single, spongy, of a light brown. *Perisperm* amygdaline, entering into the various folds of the cotyledons. *Embryo* nearly as extensive as the perisperm, erect, pure white. *Cotyledons* two, foliaceous, nearly round, variously folded. *Plu-*



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*mula* minute, conical. *Radicle* cylindric, inferior, its point immediately opposite to the umbilicus of the seed.

I am not at present possessed of any information respecting the uses the natives make of any part of this tree, nor of the quality of its timber. It grows fast to be of considerable magnitude, and is at all times ornamental, being clothed to the ground with numerous branches, abounding in beautiful foliage.

4. P. *canescens. R.*

*Leaves* cuneate-obovate, anterior margin often slightly lobed, hoary underneath. *Cells* of the capsule with as far as four seeds each.

A native of Ceylon, from thence introduced by General Hay Macdowall, into the Botanic garden at Calcutta, where it flowers in May, and the seeds do not ripen till the April following.

*Trunk* of trees eight years old, straight, and about as thick as a man's thigh. *Bark* smooth, ash-coloured. *Branches* nearly erect, forming a tall, slender head; *young shoots* round, and hairy; general height of our young trees about twenty-five feet. *Leaves* alternate, short-petioled, cuneate-obovate, with an obtuse point, and often tending to be lobate towards the apex; smooth, lucid green above; hoary underneath; about two inches long. *Stipules* linear, generally entire, caducous. *Peduncles* axillary, generally in pairs, one-flowered, round, hoary. *Bractes* few, small, conical. *Flowers* smaller than in any of the other three species described by me, white. *Calyx* divided to the base into five, linear, revolute segments, which are ferruginously hoary on the outside, and hairy within. *Petals* falcate, obtuse, longer than the calyx. *Filaments* fifteen, with anthers; and five larger, abortive, all united near the base, and inserted on the elevated receptacle, round the base of the germ. *Germ* ovate, hairy, five-seeded, five-celled, with four seeds in each, attached to the axis. *Style* longer than the stamina. *Stig-*

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*ma* clavate, five-grooved. *Capsule* woolly, clavate-oblong, without angles, slightly marked with five longitudinal lines, where the valves separate, from two to three inches long, and about one in diameter, generally obtuse, densely cloth-ed with hoary, stellate pubescence, five-celled, five-valved. *Seeds* as far as four in each cell, two generally ripening, obliquely oval, compressed; on the upper end is a thin, broad, brown, membranaceous wing. *Integuments* two; the *exterior* one thick, with a rough, brown, spongy surface; the *inner* one tough, and lightly coloured. *Perisperm* conform to the seed, thin. *Embryo* erect. *Cotyledons* foliaceous, intricately folded. *Radicle* cylindric, inferior.

Velaga xylocarpa, *Gært. Sem.* ii. 245. *t.* 133. *f.* 2, agrees uncommonly well with the carpology of this, except in the number of seeds in each cell of the capsule; here there cannot be more than four, that being the number of their rudiments in the germ.

5. P. *lanceæfolium. R.*

*Leaves* lanceolate, acuminate, entire. *Flowers* axillary, long-peduncled. *Capsule* lanceolate; *cells* from two to four seeds.

*Beng.* Bun Kulla.

A tree, a native of the forests in the neighbourhood of Silhet, where it blossoms about the beginning of the rains in May and June; and the seed ripens at the beginning of the cold season.

*Young shoots* slender, hoary, and uncommonly straight. *Leaves* alternate, short-petioled, lanceolate, with a round base, entire, acuminate, hoary underneath, from three to six inches long by one and a half broad. *Stipules* generally bifid, or trifid, ferruginous. *Peduncles* axillary, half the length of the leaves, round, slender, clavate at top, supporting a single, pretty large, white fragrant flower. *Bractes* two, or three, rather above the middle of the peduncle, like the stipule, but more divided. *Calyx* five-cleft; *segments* linear, revo-



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lute, hoary. *Petals* five, rather longer than the calyx, obliquely cuneiform. *Stamina* as in the genus, viz. fifteen fertile filaments, with five longer, sterile ones; all are united at the base, and inserted on the cylindric receptacle, which elevates them and the germ. *Anthers* fifteen, linear, erect. *Germ* oblong, five-celled, with about four seeds in each, attached to the axis. *Style*, the length of the sterile filaments. *Stigma* clavate. *Capsules* lanceolate, hoary, with very light gray, soft, short pubescence, very obscurely five-cornered, five-celled, five-valved. *Seeds*, from two to four in each cell, attached as in the germ, oval winged; the wing nearly as broad as the seed, and about three or four times its length.

## MONADELPHIA POLYANDRIA.

### *ADANSONIA. Schreb. gen. N.* 1126.

*Calyx* simple, five-cleft. *Style* long. *Stigma* with ten rays. *Capsule* woody, ten-celled. *Seeds* many in a pulp.

A. *digitata. Willd.* iii. 730.

This tree is scarce in India, and probably not a native of Asia, for hitherto only a few have been found of any great size at Allahabad, Masulipatam, on the coast of Coromandel, or in Ceylon. In the Botanic garden they blossom in May and June, and the seed ripens during the cool season.

General Hay Macdowell in a letter to Dr. R. dated Mantolle, (on the Island of Ceylon,) 2nd July, 1802, says:—

"In my walk last night on the ruins of this once rich and extensive city, called by the natives Mande or Maddooolltum, I chanced to observe a tree whose prodigious magnitude induced me to measure it, and I found it to be nearly fifty feet in circumference, above six feet from the ground, the natives call it *Peerig*, and from what I have been able to collect, it is not indigenous here. There are a great many of them scattered about at this place, and it seems to me to be the *Adansonia*."

In the Botanic garden at Calcutta, are many trees, the

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largest is about twenty-five years old, with an irregular, short, sub-conical trunk, which is eighteen feet in circumference, from four to five feet above ground; the branches diverge far all round: the leaves are deciduous during the cold season, and appear with flowers in May and June.

*BOMBAX. Schreb. gen. N.* 1127.

*Calyx* simple, from three to five-toothed. *Corol* five-petalled. *Stamina* five, or many. *Capsule* five-celled, five-valved. *Seeds* woolly.

1. B. *pentandrum. Willd.* iii. 731.

*Trunk* while young, armed. *Flowers* drooping, pentandrous. *Styles* declined. *Stigma* entire. *Leaves* digitate.

*Teling.* Cadami.

Ceiba pentandra. *Gært. Sem.* ii. 244. *t.* 133.

Panja. *Rheed. Mal.* iii. *p.* 49, 50, and 51. The first of these gives a good idea of the general habit of the tree. Rumphius's fig. (*vol.* i. *t.* 10.) is too bad to be quoted.

*Beng.* Shwet simool.

This elegant, straight, sub-verticelled tree, seems to differ from the West India species, probably specifically; it is found in every part of India. On the Coromandel coast, the Tamuls plant them about their temples. In Bengal, where the winters are colder, the leaves drop off during the cold season. In February, when destitute of foliage, the blossoms appear, and soon afterwards the leaves; and the seed ripens in May.

*Trunk* perfectly straight, in large trees five or six feet in circumference, tapering regularly like the mast of a ship.*

* Jacquin says of the West India tree, "Truncus est erectus, figura valde inequali, rarissime regularis sæpius circa medium ventricosus, aut crassior superne quam in ipsa basi, &c." which makes me doubt their being the same. Gærtner's figure of the peri-

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*Bark* smooth, and thinly armed with conic-based prickles, while young, green, then ash-coloured; *branches* sub-verticelled, and spreading horizontally like the stages of the compound table called a *dumb waiter;* they are generally in threes, and at all times destitute of prickles, and like the trunk, covered with smooth, ash-coloured bark. *Leaves* alternate, petiolate, digitate. *Leaflets* short-petioled, generally seven in number, though sometimes varying from four to ten, lanceolate, entire, and smooth on both sides, the interior by far the smallest, being from one to two inches long, while the exterior are two or three times longer. *Petioles* round, about the length of the longest leaflets. *Stipules* small, caducous. *Flowers* numerous, in fascicles, about the end of the branchlets, pretty large, of a dull white colour, peduncled, drooping. *Peduncles* clavate, three, four, five, or more from the axillary germ of the fallen leaf; one-flowered, round and smooth. *Calyx* one-leaved, four or five-toothed; on the *outside* a little rugose, on the *inside* somewhat villous. *Petals* five, oblong, spreading, villous on the outside, smooth within. *Filaments* five, curved, smooth, rather shorter than the corol, united at the base into a thick fleshy envelope for the germ. *Anthers* large, consisting of two or three variously convoluted lobes, with a double line of bright yellow pollen on the exterior margin. *Germ* conical. *Style* as long as the stamens, much contracted near the base by the fleshy envelope, formed by the united bases of the filaments, immediately above it is much swelled, and considerably bent to one side. *Stigma* headed, obscurely five-lobed. *Capsule* (in our Indian plant) oblong, in size and shape like a smooth skinned cucumber, when ripe somewhat ligneous, and not readily opening spontaneously, five celled, five-valved, partitions membranaceous. *Seeds* numerous, somewhat pear-shaped, smooth, black, each involved in its own proper portion of

carpium of the same plant, which he calls *Ceiba pentandrus* is also much too thick at the apex for our Indian tree.

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very fine, soft, silky wool, which in this species adheres slightly to the seed.

2. B. *heptaphylla. Willd.* iii. 732.

*Trunk* and *branches* armed. *Leaves* digitate; *leaflets* cuspidate. *Stamina* numerous, in two series of fascicles. *Stigma* five-cleft.

Moul elavou. *Rheed. Mal.* iii. *p.* 61. *t.* 52.

Salmuli, the Sanscrit name; see *Asiat. Res.* iv. 296.

*Beng.* Simul.

*Teling.* Boorgha.

This is one of the largest of our Indian trees and is found almost every where; over the northern Circars, near the mountains, they grow to a greater size than I have seen them any where else, often about one hundred feet high, the trunk thick and ramous in proportion. Flowering time, the end of winter, when the tree is totally destitute of leaves. The great numbers of very large, bright red flowers with which it is then covered, makes it remarkably conspicuous at a very great distance.

*Trunk* straight, covered with innumerable, crowded, short, sharp, conic aculei, the bark is also very scabrous, and deeply cracked, outwardly ash-coloured, inwardly red. *Branches* sub-verticelled, variously bent, but generally in a horizontal direction, and armed like the trunk. *Leaves* alternate, long-petioled, digitate. *Leaflets* five, six, or seven, petiolated, broad-lanceolate, long, fine-pointed, entire, smooth on both sides, from six to twelve inches long. *Petioles* longer than the leaflets, round, smooth. *Petiolets* short, channelled on the upper side. *Stipules* small, caducous. *Flowers* numerous, collected in fascicles at and near the extremities of the otherwise naked branchlets, very large, of a bright, lively red colour; they contain a large portion of sweet liquid, which birds are fond of. *Bractes* small, caducous. *Calyx* cup-shaped, circumcised, of a thick leathery texture; covered on the inside with white, silky down; on the outside pretty

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smooth. *Border* in general obscurely three or four-parted; as the corol expands, these are often so much split, as to appear four, five, or more cleft, separating to near the permanent base, which, with the corol and stamina, drop off in one body. *Corol* of five, very distinct, oblong, first spreading, then recurved, contorted, smooth, deep red, fleshy, oblong petals, of about twice the length of the stamens. *Filaments* in two series; the *interior* ones pressing on the style, and consisting of five longer and thicker, and ten shorter; the *exterior* series contains from fifty to sixty, united into five, distinct phalanges, all these are united at the base, into one fleshy envelope for the germ. *Anthers* incumbent, involute, reniform, those of the larger filaments of the interior series are double, on all the rest single pollen, the colour of Scotch snuff. *Germ* conical. *Style* longer than the stamina. *Stigmas* five, subulate, recurved. *Capsule* oblong, tapering equally toward each end, five-celled, five-valved, downy on the outside. *Seeds* numerous, obovate, smooth, except a sharp, cross-shaped ridge on one side, immersed in a very large quantity of very fine silky wool; this wool does not adhere to the seeds, but rather seems to grow from the inside of the valves of the capsule.

In my description of this tree, I have been particularly full, because I am inclined to think it differs essentially from the West Indian species, which Linnæus called *Ceiba*. Jacquin's full, and I presume, accurate description of that tree is now before me, and leaves in my mind little doubt of their being very different. This and the former *pentandrum*, are the only species of this genus I have hitherto met with in India, except B. *gossypinum*, which is polyandrous. If this be not what Linnæus calls B. *heptaphyllum*, and Jacquin, *Septenatum*, I cannot say what it is. He quotes *Moul elavou* of the *Hortus Malabaricus* for it; and at the same time points it out to be an American tree. Be that as it may, there can be no doubt of Rheed's plant being the one I have now described and figured.

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The wood is white, light and spongy, fit for very few purposes. In India the wool is used to stuff beds and pillows, and to put between the folds of quilted cloth.

3. B. *gossypinum. Willd.* iii. 732.

Arboreous, unarmed. *Leaves* five-lobed; *flowers* panicled, polyandrous. *Capsule* sub-globular, five-lobed.

*Teling.* Kong.

A large beautiful tree, a native of the Circar mountains, it is also cultivated in gardens on many parts of the coast.

*Leaves* deciduous during the cold season. The *flowers* appear about the beginning of the hot season, at which time the tree is destitute of leaves, but they soon succeed the flowers. *Trunk* erect, from eight to eighteen feet high, often much thicker than a man's body; the head is large in proportion to the trunk, and very branchy. *Bark* smooth, ash-coloured. *Leaves* scattered about the ends of the branchlets, from three to five-lobed, above pretty smooth, below covered with whitish down, with the *lobes* entire, acute. I never could observe any thing like a gland on any part of the under nor upper side. *Petioles* as long as the leaves, that is from two to eight inches, downy. *Stipules* linear, acute, caducous. *Flowers* terminal, numerous, sub-panicled, very large, of a bright yellow. *Bractes* stipule-like, and caducous. *Calyx* five-leaved; *leaflets* oblong, concave. *Petals* five, obliquely obovate, obliquely and deeply emarginate, or rather cleft, spreading, embracing one another, as in the contorted plants. *Filaments* numerous, short, distinct as in many of the polyandrous plants. *Anthers* linear, nearly as long as the filaments. *Germ* above globular. *Style* rather longer than the stamens, but considerably bent to one side. *Stigma* simple. *Capsule* broad turbinate, as large as a goose-egg, five-lobed, five-celled, five-valved. *Seeds* numerous, kidney-shaped, woolly.

The cotton is of a soft, silky nature, not employed for any



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use by the natives; the wood is also very soft, and of little or no use.

*SIDA. Schreb. gen. N.* 1129.

*Calyx* simple, five-toothed. *Style* many-parted. *Capsule* (or *arils*) conjoined round a common receptacle, from one to three-seeded.

1. S. *microphylla. Willd.* iii. 739.

Suffruticose, ramous. *Leaves* from round-cuneate, to lanceolate, serrate, hoary underneath. *Flowers* solitary, decandrous. *Capsules* five, with two sub-ovate seed horns, and a double, scabrous, hairy ridge on the back.

A native of Bengal, where it is in blossom the whole year round.

*Flowers* expand at nine in the morning. *Trunk* trifling. *Branches* numerous, slender, straight. *Bark* of the ligneous parts ash-coloured, height of the whole plant from one to three feet. *Leaves* short-petioled, from round-cuneate to lanceolate, and rhomb-lanceolate, serrate, slightly three-nerved, hoary with white down underneath, from one to two inches long. *Petioles* villous, scarcely one-sixth part the length of the leaves. *Stipules* slender, filiform, a little flattened. *Peduncles* solitary, axillary, one-flowered, when in blossom about the length of the petioles, but lengthening much by the time the seed is ripe. *Flowers* small, yellow. *Petals* distinct, obliquely triangular. *Stamens* about ten. *Style* five-cleft. *Capsules* five, about the length of the calyx, horned, with a scabrous, hairy, double ridge running down from the horns; when ripe the upper half falls off like that of the capsula circumcissa. *Seed* solitary.

2. S. *cuneifolia. Roxb.*

Suffrutex. *Leaves* wedge-shaped, retuse, not serrate.

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*Flowers* solitary; *petioles, flower* and *stipule*-bearing, decandrous; *arils* five.

*Teling.* Multo-opullakum.

A small, irregular, shrubby species, found on pasture lands, about hedges, under the shade of trees, &c. It flowers through the wet and cold seasons.

*Stem* woody, short; *bark* gray, somewhat scabrous. *Branches* many, irregular, the whole plant is about two or three feet high. *Leaves* scattered, very short-petioled, wedge-formed, retuse, with a small toothlet in the hollow, not serrate, downy underneath, about half an inch long, and one-fourth broad. *Stipules* subulate, inserted into the petioles near their base. *Flowers* petiolary, solitary, peduncled, inserted on the petioles between the stipules, pretty large, yellow, opening in the afternoon. *Filaments* ten, five spreading, and five erect. *Style* five-cleft. *Arils* five, about as high as the calyx, pretty smooth, most slightly two-knobbed.

3. S. *acuta. Willd.* iii. 735.

Suffruticose; *branches* flexuose, with spreading bifarious branchlets. *Leaves* lanceolate, serrate, smooth. *Peduncles* solitary, one-flowered. *Flowers* polyandrous. *Capsules* five, two-horned.

*Beng.* Kiretta.

Tsjeru-parua. *Rheed. Mal.* x. 53.

A native of Coromandel. Flowers in the rainy and cool seasons.

4. S. *humilis. Willd.* iii. 744.

Perennial, diffuse, hairy. *Leaves* round-cordate, serrate, hairy. *Flowers* solitary, long-peduncled. *Capsules* five, hornless.

Sida pilosa. *Retz. Obs.* i. *p.* 23.

*Teling.* Nalla benda.

*Beng.* Junka.

Sida unilocularis, *L'Herit. nov. p.* 117. *f.* 66, is said to be



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an erect plant, ours is always diffuse, indeed spreading flat on the ground. I should therefore doubt their being the same.

A native of various parts of India, and in flower most part of the year.

5. S. *periplocifolia. Willd.* iii. 741.

Shrubby; *leaves* cordate-sagittate, entire, hoary underneath. *Stipules* filiform. *Peduncles* solitary, length of the leaves, one-flowered. *Capsules* five, two and three-seeded, sharp-horned.

A native of the Malay Islands. Flowers and ripens its seed in the Botanic garden at Calcutta great part of the year. The bark of this abounds in serviceable flaxen fibres, and as it shoots quickly into long, simple twigs, particularly if cut near the earth, it answers well for procuring the fibre of a good length for most purposes.

6. S. *glutinosa. R.*

Herbaceous, erect, very hairy, and glutinous. *Leaves* cordate, pointed, serrate. *Flowers* numerous, fascicled. *Arils* five, shorter than the calyx, with two short conic hornlets. Seems herbaceous, but I cannot say with any degree of certainty; it is a rare, pretty large, erect species, growing chiefly on sandy ground.

*Leaves* alternate, petioled, cordate, serrate, acute, hairy, glutinous, in consequence, they as well as the whole of the plant, for every part exudes a tenaceous gluten, is covered with sand, or dust; from one to five inches long, and of a proportional breadth. *Petioles* round, hairy, from one to two inches long. *Stipules* bristle-shaped. *Peduncles* axillary, and terminal, generally more than one, with small leaves mixed, round, hairy, one-flowered. *Flowers* small, yellow. *Arils* five, rather shorter than the calyx, obtusely two-horned, pretty smooth.

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7. S. *polyandra. Roxb.*

Annual, or biennial, erect, ramous, pubescent. *Leaves* cordate, repand-dentate, cuspidate. *Stipules* bristle-shaped. *Flowers* solitary, drooping, sub-polyandrous; *petals* reflex. *Capsules* five, two-valved, from three to four-seeded.

A native of Coromandel, from thence introduced into the Botanic garden by Dr. Berry, where it blossoms during the cool season. It is in general annual, though sometimes the root, and lower part of the stem remains alive, and throws out new branches the second year.

*Root* often biennial, or more. *Stem* erect, with numerous, somewhat expanding, nearly straight, round branches, from the base to the top; all the tender parts clothed with much very soft pubescence; height of the whole plant, in a good soil, about six or seven feet; the whole decays annually down to the root, or nearly so. *Leaves* alternate, long-petioled, cordate; *margins* repand-dentate; *apex* long, and slender, with a rather obtuse point; from two to eight inches long, and from one to seven broad. *Stipules* subulate, and generally coloured. *Peduncles* axillary, solitary, one-flowered, near the apex jointed, and then so much recurved, as to make the flowers droop while expanded, general length two or three inches. *Flowers* large, yellow, remaining expanded through the day. *Petals* reflex. *Filaments* about fifty, very straight, united at the very base only, and there the short tube is hairy on the outside. *Anthers* reniform. *Germ* five-sided, hairy. *Styles* five, rather longer than the stamina. *Stigmas* headed, but small and smooth. *Capsules* five, much longer than the calyx, each terminating in a sharp, single, conic horn, until ripe, when it splits in two on both sides, from the apex to the base, in fact, completely two-valved, and one-celled. *Seeds* three or four in each capsule, obliquely-reniform, attached to the common axis above the middle.

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8. S. *alba. Willd.* iii. 757.

Suffruticose. *Leaves* cordate-ovate, serrate, downy, insertions of the petioles embraced by three large glands. *Flowers* axillary, fascicled; *arils* from five to six, two-horned.

*Teling.* China-mootam.

This is a small shrubby, perennial plant. A native of lands that have lately been in cultivation. It flowers during the wet and cold seasons.

*Stem* erect, winding from branch to branch, often coloured. *Branches* many, arising; *young shoots* covered with mealy, soft, stellate down. *Leaves* alternate, petioled, three-nerved, cordate, obtuse, sometimes nearly retuse, and the base often topped as if cut across, serrate, downy; from half an inch to two inches long. *Petioles* half or three quarters the length of the leaves, their insertions surrounded with three large, hard glands, one on each side, and one below. *Stipules* subulate, inserted into the lateral glands. *Peduncles* axillary, several, short, one-flowered. *Flowers* small, white. *Petals* obliquely triangular. *Arils* from five to six, hid in the calyx, two-horned; horns divaricate. The stipulary glands are a good specific mark.

9. S. *alnifolia. Willd.* iii. 741.

Suffruticose. *Leaves* from oval to round, serrate, downy. *Peduncles* axillary, solitary. *Stamina* from twelve to fifteen; *fascicles* from three to six. *Capsules* from five to seven, shorter than the calyx, two-horned.

*Teling.* Ter-nalla-benda.

A native of the Circars, and like the rest, flowers during the rains and cold season.

10. S. *chinensis. Retz. Obs.* iv. *N.* 94.

Suffruticose. *Leaves* oval, serrate, hoary underneath; *peduncles* solitary, one-flowered; *stamens* thirty; *arils* from six to seven. Small, ramous; *bark* of the woody part whitish; *young parts* purple-coloured, slightly scabrous, covered with

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soft stellate down, which without a lens seems to be farina. *Leaves* alternate, short-petioled, very various in form on the same plant, viz. orbicular, oval, wedge-formed, narrow lance-rhombiform, all obtuse, and in general serrate, three-nerved; above pretty smooth, below hoary, from half an inch to an inch and a half long, breadth various; *margins* often coloured. *Stipules* linear, inserted into glands. *Peduncles* axillary, solitary, erect, as long or longer than the leaves, jointed above the middle, one-flowered. *Flowers* yellow. *Filaments* about thirty, issuing single from the mouth of the tube, irritation sets them in motion. *Arils* from six to seven, turnip-formed, shorter than the calyx, without horns, pretty smooth.

*Note.* I have seen a variety with white flowers. They have a heavy, disagreeable smell.

11. S. *Napaca. Willd.* iii. 766.

Shrubby. *Leaves* acutely-lobed, serrate-dentate. *Peduncles* from four to six-flowered. *Capsules* about seven or eight, acuminate.

Napaca *hermaphrodita. Ed. sp. pl.* 965.

Sida *Napaca. Cavan. Diss.* v. *p.* 277. *t.* 132. *f.* 1.

Native place very doubtful. Flowers during the cold season in the Botanic garden at Calcutta.

12. S. *lanceolata. Willd.* iii. 736. *Retz. Obs.* iv. *p.* 28.

Perennial, erect. *Leaves* ovate-lanceolate, serrate, villous. *Stipules* lanceolate, sometimes ciliate. *Peduncles* solitary, the length of the stipules. *Capsules* from eight to ten, two-horned, shorter than the calyx.

A native of Bengal. Flowers in the cold season.

13. S. *retusa. Willd.* iii. 740.

Shrubby. *Leaves* short-petioled, cuneate, serrate, retuse, hoary underneath. *Stipules* filiform. *Peduncles* axillary, solitary, shorter than the leaves, one-flowered. *Capsules* from eight to ten, one-horned.

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Kurundoti. *Rheed. Mal.* x. *t.* 18.

Silagurium vulgare. *Rumph. Amb.* vi. *t.* 19.

A native of Bengal and the Moluccas. Flowers in the cool season, in the Botanic garden at Calcutta.

14. S. *rhomboidea. Roxb.*

Shrubby, erect, ramous. *Leaves* short-petioled, narrow-rhomboidal, serrate, three-nerved, villous. *Stipules* setaceous. *Peduncles* axillary, solitary, shorter than the leaves, one-flowered. *Capsules* ten, without beak.

*Hind.* and *Beng.* Sufet or Shwet Bariala, or Berela.

A native of Bengal, where it blossoms during the cold season. The flowers expand at noon.

*Stem* erect, ligneous. *Branches* ascending; *young shoots* a little mealy, height of the whole plant from three to six feet. *Leaves* alternate, short-petioled; the inferior in young plants rhomboidal; the superior amongst the flowers lanceolate, all are serrate, more or less three-nerved and villous, particularly underneath, and there hoary also; size very various. *Stipules* longer than the petioles, bristle-shaped. *Peduncles* axillary, solitary, slender, erect, shorter than the leaves, one-flowered; the smaller branchlets in the axills of the leaves, with their flowers often give the appearance of two or more flowers from the same axill. *Corol* sub-rotate, small, pale yellow. *Petals* very obliquely and deeply retuse. *Stamens* numerous from the apex of their tube. *Style* about ten-cleft. *Capsules* (or *arils*) generally ten, forming, before ripe, a depressed, somewhat umbilicated orb, and nearly covered by the incurved divisions of the calyx singly; when ripe, gaping at the top, and having then the appearance of being two-horned. *Seed* solitary. It differs from *rhombifolia* (Linn.) in the arils having no horns.

15. S. *rhombifolia. Willd.* iii. 740.

Shrubby, coloured. *Leaves* short-petioled, rhomb-lanceolate, serrate, soft underneath. *Peduncles* solitary, nearly as

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long as the leaves, one-flowered. *Stipules* filiform. *Capsules* ten, with one straight sharp horn.

Malvinda unicornis. *Dill. Elth.* 216. *t.* 172. *f.* 212.

Sida foliis lanceolato-rhomboidibus. *Flor. Zeyl. N.* 252.

*Hind.* and *Beng.* Lal-bariala, or berela.

A native of Bengal; flowers during the rainy season.

The bark of this and the last, *(rhomboidea)* yield abundance of very delicate flaxy fibres, and I think might be advantageously employed for many purposes. When the seed is sown thick on a good soil, the plants grow tall and slender, without branches, and every way fit for such purposes.

16. S. *cordifolia. Willd.* iii. 758. *Fleming in Asiat. Res.* xi. 178.

Herbaceous, downy, and hairy. *Leaves* cordate. *Peduncles* solitary, one-flowered. *Capsules* ten, with two long straight, backwardly hispid horns.

Katu-uren. *Rheed. Mal.* x. *t.* 54.

Batyulaka, its Sanscrit name.

*Hind.* and *Beng.* Bariala, or barela.

A native of Coromandel, Bengal, &c. and with the rest blossoms during the rains, and cool season.

*With more than ten, from two to three-seeded Capsules.*

17. S. *crispa. Willd.* iii. 747.

*Stem* sub-erect, with long, diffuse branches. *Leaves* petioled and sessile, round-cordate, crenate, acuminate, downy. *Stipules* filiform. *Peduncles* solitary, filiform, one-flowered. *Pericarp* perfectly globular, and pendulous. *Capsules* twelve, oval, inflated, from two to three-seeded.

A native of the coast of Coromandel. In blossoms during the greater part of the year.



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18. S. *abutilon. Willd.* iii. 750.

Annual, erect, coloured, villous. *Leaves* cordate, acuminate, dentate-serrate. *Peduncles* axillary, solitary. *Capsules* fourteen or fifteen, from two to three-seeded, hairy, much longer than the calyx, reniform, with a long, spreading, sharp, two-partible horn.

Abutilon læve. *Rumph. Amb.* iv. *p.* 31. *t.* 11.

A native of various parts of India, though not common. The seed has been received from Pekin into the Botanic garden, under the name *King-ma* and is said to be cultivated in that Province as a substitute for hemp and flax.

19. S. *tomentosa. Roxb.*

Annual, erect, very downy. *Leaves* round-reniform, grossly serrate. *Peduncles* axillary, one-flowered; *arils* twenty, reniform, very downy.

A native of rubbish, road sides, hedges, &c. where the soil is good, but a very rare species. Flowers during the cold season.

*Stem* annual, sub-erect, from three to four feet high, branchy, round, very downy, as is every part of the plant. *Branches* ascending, stem-like. *Leaves* alternate, petioled, rather round kidney-formed, some few are pointed, but in general rounded at the apex, irregularly toothed, very downy, about as long as the petioles, size very various, the larger are about five or six inches long, and from four to five broad. *Stipules* lanceolate, reflected. *Peduncles* axillary, solitary, one-flowered, shorter than the petioles where the leaves are large. *Flowers* large, of a bright deep orange colour. *Petals* obliquely triangular; the *interior* margin deeply divided into two unequal lobes. *Capsules* about twenty, nearly as high as the calyx, in a depressed verticel, very downy, reniform, equally rounded at each end, this mark distinguishes it immediately from S. *indica*, and *asiatica*. *Seeds* generally three, a little scabrous, white, bearded.

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20. S. *asiatica. Willd.* iii. 750.

Biennial, downy, and glutinous. *Leaves* round-cordate, subulate, grossly serrate. *Peduncles* solitary, one-flowered. *Petals* obliquely triangular, embracing each other. *Capsules* about twenty, equalling the calyx, truncate, with a conic hornlet. *Eye* of the seed bearded.

*Teling.* Tootea-benda.

*Hind.* and *Beng.* Petaree, also Jhampi.

A native of various parts of India, and in blossom and seed most part of the year.

21. S. *populifolia. Willd.* iii. 751.

Sub herbaceous, villous, not glutinous. *Leaves* round-cordate, sub-lobate, grossly serrate. *Petals* obliquely triangular, and remote. *Capsules* twenty, truncate, longer than the calyx.

*Teling.* Noogoo-benda.

Beloere. *Rheed. Mal.* vi. *t.* 45.

A native of various parts of India, and like *asiatica* in flower and seed all the year.

22. S. *indica. Willd.* iii. 752.

Sub-herbaceous. *Leaves* round-cordate, sub-lobate, grossly serrate. *Petals* evenly obcordate, embracing each other. *Capsules* twenty, truncate, longer than the calyx.

I have not been able to learn that the natives have any other name for this than that by which *populifolia* is known, and with it, and *asiatica*, it is found common over most parts of India; on the coast of Coromandel, these species are most generally used as a substitute for the officinal Altheæ and Malvæ.

23. S. *graveolens. R.*

Herbaceous, erect, ramous, every part clothed with clammy pubescence. *Leaves* round-cordate, crenulate, rarely lobate. *Stipules* falcate. *Flowers* axillary, solitary. *Corol*



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rotate, fruit sub-globular, compound, of about twenty, obliquely reniform, three-seeded capsules.

*Hind.* Bura-banghi about Cawnpore, where indigenous. From that place Colonel Hardwicke sent the seeds to the Botanic garden where the plants thrive most luxuriantly, and blossom chiefly about the close of the rains, and beginning of the cold season. In a favourable soil they grow with an erect stem to the height of six, eight, or even more feet; with numerous, spreading branches, forming a beautiful, large, ovate bush; all the young parts are covered with much clammy down, intermixed with some larger, very soft hairs.

*Leaves* alternate, petioled, round-cordate, crenulate, five or seven-nerved; the larger ones on the stems of young luxuriant plants are sometimes slightly lobate; both sides covered with the same clammy pubescence, from two to twelve inches each way. *Petioles* almost as long as the leaves. *Stipules* reflexed, narrow-falcate, acute. *Peduncles* axillary, solitary, sub-erect, generally shorter than the petioles, one-flowered. *Flowers* large, of a deep orange colour, with a dark ferruginous spot in the centre. *Corol* rotate; lancinia obcordate. *Fericarpium*, fruit almost round, nearly the length of the calyx, composed of about twenty, three-seeded, villous, obtuse-pointed capsules. The fresh plant possesses a strong, peculiarly unpleasant smell.

*ALTHAEA. Schreb. gen. N.* 1132.

*Calyx* double; the exterior one from six to nine-cleft. *Capsules* many, one-seeded.

A. *rosea. Willd.* iii. 773.

Herbaceous, erect, ramous. *Leaves* from five to seven-lobed, angular.

Alcea rosea. *Linn. Miller's Illustrations.*

Holly-hock.

*Hind.* Gool-khyru.

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*Pers.* Kuli-humesha, Babor.

As in Europe, the varieties of this plant are numerous over India; but always in a cultivated state only; at least I have never met with it in any other. Our most beautiful sorts come from China.

*MALVA. Schreb. gen. N.* 1143.

*Calyx* double; the exterior one three-leaved. *Capsules* many, one-seeded.

1. M. *Mauritiana. Willd.* iii. 787.

Annual, erect. *Leaves* five-lobed. *Peduncles* and *petioles* smooth.

M. *sinensis. Caran. Diss.* ii. *t.* 25. *f.* 4.

The Hindoos of these parts have no name for this plant, it is only found in gardens; the seeds are generally brought from Hydrabad. It is annual; flowering time the cold season.

*Stem* erect, smooth, shining, from three to five feet high. *Leaves* alternate, petioled, of a roundish kidney-form, slightly five or seven-lobed, five or seven-nerved, crenulate, soft, but smooth, from two to six inches each way. *Petioles* as long as the leaves, round, smooth. *Stipules* oval, acute. *Peduncles* axillary, several, round, smooth, about two-thirds shorter than the petioles, one-flowered. *Flowers* numerous, large, of a beautiful pale, rose-colour, striated with deep red. *Exterior calyx*, the leaflets narrow-cordate, inserted upon the inner calyx, smooth. *Petals* remote, broad wedge formed. *Arils* from ten to fifteen, depressed, umbilicated.

2. M. *rotundifolia. Willd.* iii. 786.

Annual, prostrate. *Leaves* cordate, obsoletely five-lobed.

A native of Persia, as well as of Europe.

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*URENA. Schreb. gen. N.* 1137.

*Calyx* double; the exterior one five-cleft. *Capsule* five-celled, five-partible; *divisions* one-seeded.

1. U. *lobata. Willd.* iii. 800.

Perennial, bushy. *Leaves* round-cordate, angled. *Capsules* glochidate.

*Beng.* and *Hind.* Bun ochra.

Lappago Amboynica. *Rumph. Amb.* vi. *t.* 25. *f.* 2.

Common over most parts of India. Flowers during the rains and cool season in Bengal.

2. U. *sinuata. Willd.* iii. 802.

Perennial, bushy. *Leaves* sinuous, palmate, hairy, sinuses obtuse; lobes gashed; *margins* serrate-cuneate. *Capsules* glochidate.

Uren. *Rheed. Mal.* x. *t.* 2.

*Beng.* and *Hind.* Kungooya.

*Teling.* Palia mankena.

Malvinda foliis inferioribus multifidis. *Burm. Zeyl. t.* 69. *f.* 2.

This is also common over most parts of India. The bark of these two yields a strong and tolerably fine substitute for flax.

3. U. *palmata.*

Erect, ramous; tender parts clothed with stellate pubescence. *Leaves* long-petioled, roundish, many-lobed, serrate-dentate. *Capsules* smooth.

Found in Rohilcund by Col. Hardwicke, in flower and seed in September.

4. U. *repanda.*

Shrubby, erect, ramous, pubescent. *Leaves* ovate-cordate, repand, serrate-dentate. *Capsules* smooth.

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A low, stout, very ramous species, a native of Coromandel; flowers in October.

*GOSSYPIUM. Schreb. gen. N.* 1138.

*Calyx* double; the exterior one three-parted. *Capsules* from three to five-celled. *Seeds* clothed with cotton wool.

1. G. *obtusifolium. R.*

Shrubby, very ramous. *Leaves* small, with three, rarely five, obtuse, ovate, entire lobes. *Stipules* falcate. The *exterior calyx* with entire divisions. *Capsules* ovate; *cells* three-seeded. *Seeds* free and clothed with firmly adhering, short, greenish-gray down, under a small portion of ash-coloured wool.

A native of Ceylon, but not cultivated. Flowers during the rains and cold season in the Botanic garden at Calcutta.

2. G. *arboreum. Cavan. Diss.* vi. 311. *t.* 193. *Willd.* iii. 804.

Shrubby, thin of branches. *Leaves* from three to five-lobed, hairy. *Stipules* ensiform. *Leaflets* roundish pointed. *Seeds* free, but downy under the white wool.

G. *herbaceum. S. Xylon Madraspatense rubicundo pentaphyllum. Pluck. Am. p.* 172. *f.* 3. seems to me to be this plant, but I cannot bring myself to think *Cudu pariti* of the *Hortus Malabaricus*, i. *t.* 31. to be the same. It may probably be Gærtner's *Gossypium religiosum.* In both, the capsules are nearly round, and I know of no other species with any thing like a round pericarpium.

It is found in the gardens of the curious over most parts of India, where it is in flower great part of the year.

From my enquiries and observations, it does not appear ever to be cultivated for its wool.

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3. G. *herbaceum. Willd.* iii. 803.

Bi-triennial; *young parts* hairy. *Leaves* hoary, palmate, with sub-lanceolate, rather acute lobes. *Stipules* falcate-lanceolate. *Leaves* of the exterior calyx dentate. *Capsules* ovate, pointed. *Seeds* free, clothed with firmly adhering, white down, under the long white wool.

Gossypium. Capas. *Rumph. Amb.* iv. *p.* 33. *t.* 12.

*Sans.* Karpassee.

*Hind.* Rewee.

*Beng.* Kapass.

G. *herbaceum. Cavan. Diss.* vi. *p.* 310. *t.* 164. *f.* 2.

*Arab.* Kootn.

*Teling.* Pati-chittoo the plant, and Pati the cotton itself.

This and its varieties are by far the most universally cultivated by the natives of India. The most conspicuous of these varieties are the Dacca, Berar, and China cottons.

Dacca Cotton may be reckoned the first variety, or deviation, from the last mentioned common sort.

G. *herbaceum* is in general cultivation all over Bengal and Coromandel. It is reared about Dacca, and furnishes that exceedingly fine cotton wool employed in manufacturing the very delicate, beautiful muslins of that place. The Dacca variety differs from the common G. *herbaceum* in the following respects.

1*st.* In the plant being more erect, with fewer branches, and the lobes of the leaves more pointed.

2*nd.* In the whole plant being tinged of a reddish colour, even the petioles, and nerves of the leaves, and being less pubescent.

3*rd.* In having the peduncles which support the flowers longer, and the exterior margins of the petals tinged with red.

4*th.* In the staple of the cotton being longer, much finer, and softer.

These are the most obvious disagreements, but whether they will prove permanent I cannot say at present. The

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most intelligent people of that country (Dacca) think the great difference lies in the spinning, and allow little for the influence of soil.

BERAR COTTON, I call the second variety. It is in cultivation over the Berar country; and is from thence imported into the Circars, or Northern Provinces, by Sada, Balawansa, &c. to Yourma-goodum, in the Musulipatam district. With this cotton the fine Madras, more properly, Northern Circar long cloth is made.

It differs from the above-mentioned two sorts in the following respects.

1*st.* In growing to a greater size; in being more permanent, or living longer; and in having smooth and straight branches.

2*nd.* In having the leaflets of the exterior calyx more deeply divided, and the wool of a finer quality, than in the first variety.

CHINA COTTON, I call the third variety. It has lately been introduced into Bengal, from China; where it is cultivated, and its wool reckoned 25 per cent. better than that of Surat. It differs from the former sorts,

1*st.* In being much smaller, with but very few, short, weak branches.

2*nd.* In being, so far as my experience yet goes, annual.

3*rd.* In having the leaflets of the exterior calyx entire, or nearly so.

Lamarck's G. *Indicum, (Encyl.* ii. *p.* 134,) is no doubt one of these varieties, and from him Willdenow has given it a place in his *Ed.* of the *Sp. Pl. vol.* iii. *p.* 803.

4. G. *religiosum. Willd.* iii. 805.

Perennial, diffuse. *Leaves* hairy, with five acute, triangular lobes. *Stipules* cordate, acuminate. *Leaflets* of the exterior calyx deeply laciniate, colour of the corol uniform yellow. *Capsules* from four to five-celled, oblong, much pointed. *Seed* free, clothed with firmly adhering, short, tawny down, and long wool of the same colour.



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Nankeen, or brown cotton, allied to G. *hirsutum*. This species has been introduced into Bengal under the name *Nankeen cotton*, but does not thrive so well as to make it profitable; the colour of the wool tawny, and very different from the colour of the cotton cloth commonly called Nankeen, which is no doubt dyed. This can scarcely be more than a variety of *hirsutum*.

*Note*. Since writing the foregoing, a small variety of this tawny cotton has been introduced into this garden from the province of Nankeen itself, but unfortunately it promises still less than the first, and the colour and quality of the wool is much the same.

5. G. *vitifolium*. *Willd*. iii. 804.

Sub-arboreous, dark purple, and hairy. *Leaves* three, sometimes five-lobed; *lobes* triangular, and acuminate. *Capsules* oblong; sides clothed with firmly adhering short, greenish gray down, under the long, fine, white wool.

Native place uncertain, but in the Botanic garden at Calcutta it grows to be a small, ramous tree, with all the tender parts highly coloured, and very hairy. This sort is in flower and seed the whole year, and though the wool or cotton is fine and large in the fibre, it does not promise advantage to the cultivator, on account of the scantiness of the crop.

6. G. *acuminatum*. *R*.

Sub-arboreous. *Leaves* from three to five-lobed; *lobes* oblong, tapering much, and very acute. *Calyx* deeply laciniate. *Stipules* linear-lanceolate. *Capsules* long-ovate, much pointed. *Seeds* many, adhering firmly to each other, black, and free of every pubescence, except the long, white wool which is easily removed; said to be a native of the mountains to the north and westward of Bengal.

I do not find that this species is ever cultivated. It is readily distinguished by its superior size, and large black seeds, which adhere firmly to each other.

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7. G. *Barbadense. Willd.* iii. 806.

Shrubby. *Leaves* smooth, with five acute, short, broad lobes. *Leaflets* of the exterior calyx deeply laciniate, and the colour of the corol uniform yellow. *Capsules* oblong, pointed. *Seeds* free, black, and without any other pubescence than the long, fine, white wool.

BOURBON COTTON is the name this species is known by amongst the English in the East Indies. It does not appear to be a native of India, but introduced from the Island of Bourbon, some twenty years ago; at what period it was introduced from the West Indies into that Island, is uncertain. It succeeds better in the more elevated, dryer, and less fertile soil of Coromandel, than in Bengal, where the plant grows to a great size, yields less cotton, and the cultivation is very generally relinquished, though there must be many situations near the mountains of our northern frontier where it would thrive.

8. G. *hirsutum. Willd.* iii. 805.

Shrubby, tender parts hairy. *Leaves* hairy, with from three to five, triangular, acute lobes. *Exterior calyx* laciniate. *Corol* uniform pale yellow. *Capsule* ovate, acute. *Seeds* free, clothed with firmly adhering green, or gray down, under the fine, long, white wool.

Xylon Americanum prestantissimum, semine virescente. *Thunb.* 101.

This green-seeded variety has only been of late introduced into India, where the cotton is much admired by the natives. Another variety very lately introduced into the Botanic garden by Mr. Hamilton of Philadelphia, has the wool of a coarser nature, and the down which covers the seeds under it of a dirty white, or ash-colour. This promises little or no benefit to India.

After a search of above thirty years, I have not been able to find more well defined species of this genus, than the first mentioned four and the sixth species, with their varieties,



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that can be called the natives of Asia. G. *Barbadense* and *hirsutum*, being, as above-mentioned, natives of America, do not properly belong to this Flora.

## *KYDIA. R.*

*Calyx* double, exterior from four to six-leaved, spreading. *Anthers* fascicled. *Stipules* three. *Capsules* three-celled, three-valved. *Seeds* solitary.

1. K. *calycina. R. Ind. pl. N.* 215.

*Exterior calyx* four-leaved, larger than the corol.

*Hind.* Choupultea.

*Teling.* Pandikee.

I have every reason to imagine this will form a new genus; its essential character being, I think, very distinct from any of those hitherto described; nor do I believe it was known to Dr. König, for I have never met with it but amongst the Circar mountains, where he never was.

It delights in such soil as is generally found on the banks of rivulets, water-courses, &c. where it grows to be a tree of a middling size. Flowering time the cold season.

*Trunk* straight; *bark* ash-coloured. *Head* large, spreading, very ramous; *young shoots* covered with a brown mealy dust. *Leaves* alternate, petioled, broad-cordate more or less from three to five-angled, irregularly-dentate, from three to five-nerved; both sides downy; there are also small tufts of stellate hairs dispersed over both sides, together with a farinaceous dust; from three to six inches each way; on the middle nerve a little below the middle, and sometimes also on the two next to it is an oblong, hollow, yellow gland. *Petioles* round, from two to three inches long, covered with brown farina. *Panicles* terminal, large, globular, crowded, many-flowered. *Flowers* numerous, middle-sized, pure white, collected in small umbellets, many of which make a panicle. *Bractes* small, rust-coloured, downy. *Pedicels*

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filiform, round, about three quarters of an inch long, covered with brown, farinaceous powder. *Calyx* double; the *exterior* one constantly four-leaved, spreading. *Leaflets* oblong, obtuse, downy, striated; three times longer and larger than the inner calyx, permanent. The *interior* calyx one-leaved, campanulate, half five-cleft; mealy on the outside, and cloathed with white short hairs on the inside. *Corol; petals* five, obliquely-obcordate, much longer than the interior calyx, but shorter than the exterior one, woolly at the base. *Filaments* five, exceedingly short, thick, coalesced below into a tube. *Anthers* twenty, four of them sessile, round the apex of each of the short filaments, oval, lobed, one-celled. *Germ* superior, conical. *Style*, length of the tube formed by the filaments, three-cleft; *divisions* recurved. *Stigmas* very large. *Capsule* small, somewhat three-lobed, hid in the inner calyx, covered with brown farina, and stellate rugosities, three-celled, three-valved, opening from the apex. *Seeds*, one in each cell, obtusely three-sided, brown, affixed to the bottom of the cell.

*Note.* I have found many of the flowers male. As yet I am unacquainted with the uses of this tree.

2. K. *fraterna. Roxb.*

*Exterior calyx* six-leaved, shorter than the corol.

*Teling.* Potree.

This is evidently a second species of the last described; it is also a native of the Circar mountains, where it grows to be a larger tree than the former. Flowering time the rainy season.

*Trunk* straight; *bark* rust-coloured. *Leaves* as in *calycina*, even to the glands, and all the parts covered with farina in that species, are the same in this. *Panicles* terminal, composed of small umbellets as in the former species, but by no means so much crowded. *Flowers* and *bractes* the same. *Pedicels* shorter and thicker. *Calyx* double. The *exterior* one from five to six-leaved, or cleft to very near the base; *leaflets* oval, no longer than the interior perianth. The *inner*

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calyx as in the last species. *Filaments*, they are as long as the staminiferous tube itself, and spreading. *Anthers* as in the former species. *Style* the length of the staminiferous tube. *Stigmas* three-lobed, even with the mouth of the tube, three-cleft, and spreading as in the last.

I have not seen the ripe seed-vessel, but the structure and contents of the germ promise the same parts as that of the former species.

*Note.* The chief marks of specific distinction are in the exterior calyx, filaments, and pistillum.

Upon the supposition of this forming a new genus, I have ventured to give it the above name, in memory of the late Colonel Robert Kyd, of Bengal, whose attachment to botany and horticulture induced him to retire from the high rank he held in the army, to have more leisure to attend to his favourite study, to the advancement of every object which had the good of his fellow-creatures in view, and to the establishment of the Honourable East India Company's Botanic garden at Calcutta, where he was particularly attentive to the introduction of useful plants, and to their being dispersed over every part of the world, for the good of mankind in general.

*HIBISCUS. Schreb. gen. N.* 1139.

*Calyx* double; the *exterior* one many-leaved. *Capsule* five-celled, five-valved. *Seeds* a few in each cell.

SECT. I. *Leaves entire, or slightly lobed, or angular.*

1. H. *populneus. Willd.* iii. 809.

Arboreous. *Leaves* broad-cordate, entire, smooth. *Exterior calyx* scarcely any; the *interior* one almost entire. *Capsules* oblate-spheroidal, and bristly. *Seeds* downy.

*Teling.* Gangaraya.

*Tam.* Poris.

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*Beng.* Poresh.

Bupariti. *Rheed. Mal.* i. *t.* 29.

Novella littorea. *Rumph. Amb.* ii. *t.* 74.

A native of India, and its Islands, chiefly near the sea, in flower and seed all the year.

2. H. *populneoides. R.*

Arboreous. *Leaves* cordate, long-pointed, waved, smooth, glands in the divisions of the nerves. *Capsules* with two tough integuments; *seeds* from one to three in each cell, mealy.

Gorda-chanda, the Sanscrit name.

*Hind.* and *Beng.* Poris-pippal.

*Teling.* Moonee-Gangaraya.

This species is much like the former, I have found it in a few of the gardens of the natives near Samulcota; it flowers during the wet and cold seasons.

*Trunk* straight, from fifteen to twenty-five feet to the branches, thicker than a man's body. *Branches* numerous, forming a large, oblong head. *Young shoots* covered with bronze-coloured scales. *Leaves* about the extremities of the branches, alternate, petioled, cordate, waved, leathery, entire, from five to seven-nerved, long-pointed, as in *Ficus religiosa*; both sides, but particularly the under one, covered with small, round, ash-coloured scales, with a dark spot in the middle of each; at the base, in the axill of each of the principal nerves, there is a gland, which is smooth, convex above, and a deep pit below. *Petioles* as in *populneus. Stipules* subulate. *Peduncles, bractes, flowers, calyx, corol, stamens, style,* and *stigmas* as in *populneus. Capsule,* external form as in *populneus,* but large, five-celled; *integument* double; the *exterior* one, which is fragile and composed of five valves, opens from the apex spontaneously when ripe, exposing the inner lamina, which are remarkably strong, tough, reticulated with fibres, and not opening without con-

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siderable force. *Seeds* from one to three in each cell, kidney-formed, covered with brown farina.

This species is immediately to be distinguished from *populneus* by the glands in the axills of the nerves of the leaves, their waved border and long points, and by the double integument of the capsule; the innermost of which requires force and a sharp knife to open it; whereas in *populneus* it is single, and can be easily broken by the pressure of the thumb and finger.

This tree will answer better for avenues, parks, &c. than *populneus*, because it is much higher to the branches, consequently gives a free circulation to the air.

When wounded there discharges the some yellow juice as in *populneus*.

As both these trees want the most essential character, the double calyx of *Hibiscus*, I should imagine they would, with more propriety, form a new genus.

3. H. *tiliaceus*. *Willd.* iii. 810.

Arboreous. *Leaves* round-cordate. *Flowers* terminal. *Exterior calyx* ten-toothed. *Capsules* shorter than the calyx, five-valved, each divisible, though not spontaneously, ten-celled. *Seed* reniform.

Novella, *Rumph. Amb.* ii. *t.* 73, is too bad a figure to be quoted; yet I doubt not but it was intended for this tree, and although our plants are uncommonly luxuriant, I never saw any of the leaves with the least tendency to a lateral lobe.

A native of the Moluccas. Flowers in the hot season in the Botanic garden, though more or less the whole year round.

4. H. *tortuosus*. *R.*

Arboreous, with a crooked trunk, and variously bent, diffuse branches. *Leaves* round-cordate, crenulate, hoary underneath. *Stipules* and *bractes* ovate-lanceolate. *Flowers*

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terminal; *exterior calyx* eight or nine-cleft. *Capsules* ten-celled, five-valved; the length of the inner calyx.

Bala, the Sanscrit name.

*Beng.* Bola.

Pariti. *Rheed. Mal.* i. *t.* 30.

Novella repens. *Rumph. Amb.* ii. *p.* 222.

Hibiscus *tiliaceus. Lour. Cochin Ch. p.* 509.

A native of most parts of India; found chiefly near the sea, and on the banks of large rivers, at no great distance from it; growing to be a tree of considerable size, with a stout, crooked trunk, or rather, like an immense bush, with numerous, very crooked branches, spreading wide, close to the ground. Flowering time in Bengal the hot season. viz. March, April, and May; the seed ripens three or four months afterwards.

*Leaves* alternate, petioled, round-cordate, pointed, minutely crenulate, smooth above, hoary underneath; about four inches each way. *Petioles* an inch, or an inch and a half long, round, downy. *Stipules* opposite, obliquely-oblong. *Peduncles* terminal, and from the exterior axills, two or three-flowered. *Pedicels* clavate, downy. *Flowers* large, campanulate, drooping, of a bright yellow, with the inside of the bottom of the bell, dark crimson. *Bractes* opposite, obliquely oblong, very downy, caducous. *Calyx*; the *exterior* one deeply divided into seven, or ten lanceolate-conic segments; the *inner* one twin, the length of the exterior one; five-cleft, each division has a glandular protuberance. In the Molucca plant, which has been blended with this, as one species, the exterior calyx is ten-toothed, and about one third or one fourth the length of the inner calyx, both are downy, and permanent. *Germ* ovate, villous; ten-celled, each cell containing from five to eight ovula, attached to the inner angle of the cells. *Stigma* five-lobed, clothed with clammy, dark crimson filaments, with glandular heads. *Capsule* the length of the inner calyx, ovate, acute, densely clothed with stellate pubescence, of the size of a nutmeg, ten-celled, five-valved; that is, they open spontaneously into five, but may



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be split into ten, the partitions are all double; five of them stronger, and rising from the middle of the five valves. *Seeds*, generally two, three, or four ripen, obovate-reniform, attached as in the germ. *Integuments* two in the fresh seed. *Perisperm* thin, of a dull white. *Embryo* curved, green. *Cotyledons* folded. *Radicle* curved, pointing directly to the umbilicus. The fibres of the bark may be employed as a very tolerable substitute for hemp.

5. H. *setosus. R.*

*Leaves* deeply cordate, crenulate, acute, downy underneath. Tender parts thickly clothed with very long, stellate bristles. *Flowers* axillary. *Exterior calyx* ten-cleft. *Capsule* ovate, acute. *Seeds* very hairy.

A native of Prince of Wales' Island, Chittagong, &c.

6. H. *Rosa-sinensis. Willd.* iii. 812.

Shrubby. *Leaves* ovate-cordate, grossly-serrate, lucid. *Stipules* ensiform. *Flowers* axillary. *Exterior calyx* of from six to eight linear leaflets.

*Juva*, the Sanscrit name.

*Beng.* Joba, Juva, Oroo.

Shoe-flower of the English, because the flowers are frequently used for blacking shoes.

Schem pariti. *Rheed. Mal.* ii. *t.* 17.

Flos festalis. *Rumph. Amb.* iv. *t.* 8.

Of this beautiful shrub there are several varieties, viz. single and double red, single and double yellow, and white. I have only found it in a cultivated state, however the single sort is found wild in the interior parts of Hindoostan.

It continues in flower the greatest part of the year in our gardens.

7. H. *phœniceus. Willd.* iii. *p.* 813.

Shrubby. *Leaves* cordate-serrate, acute, villous. *Stipules* subulate. *Peduncles* axillary, solitary, one-flowered.

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*Exterior calyx* from five to six-leaved. *Anthers* in verticels. *Capsules* globular. *Seeds* woolly. There is a variety with pure white flowers.

*Beng.* Lall Sooryumuni, the red-flowered variety. Shwet Sooryumu, the white-flowered one.

*Teling.* Yerra-salla-burta, the red variety; and Tella the white.

Sjasmin. *Rheed. Mal.* x. *p.* 1. *t.* 1.

Found in most parts of India. Flowers chiefly during the rainy season, though more or less the whole year.

8. H. *fragrans. R.*

Arboreous, tender parts hairy. *Leaves* cordate, serrate. *Flowers* axillary and terminal. *Calyces* equal, and both equally five-cleft.

Kinurlur the vernacular name in the Silhet district, where it is indigenous, growing to be a small tree, producing, during the cool months of December and January, a profusion of large, white, fragrant flowers; the seeds ripen in two or three months after.

9. H. *syriacus. Willd.* iii. 818.

Shrubby, straight. *Leaves* rhombiform, with the anterior margins grossly crenate, often sub-lobate, tolerably smooth. *Stipules* filiform. *Flowers* axillary, short-peduncled. *Exterior calyx* of from six to eight subulate leaflets.

H. *rhombifolius. Cavan* and *Willd.* iii. 818.

Like H. *Rosa-sinensis*, there are many varieties of the plant cultivated in India. I have not yet found it in its wild state. The leaves vary from rhomboidal to three-lobed. I have therefore little doubt of H. *rhombifolius* of Willdenow and Cavanilles being the same.

10. *rigidus. Willd.* iii. 815.

Shrubby, rigid, straight, scabrous, thin of branches. *Leaves* from round to ovate-lanceolate, serrate, scabrous. *Stipules*



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minute, subulate. *Peduncles* axillary, diverging, longer than the leaves. *Petals* totally reflexed. *Anthers* verticelled. *Capsules* round. *Seeds* woolly.

*Teling.* Salla-Burta.

A native of Coromandel. Flowers during the rainy season.

I am strongly inclined to think H. *hirtus* and *micranthus*, are nothing more than accidental varieties of this plant; soil and situation make it vary exceedingly.

11. H. *tubulosus. Willd.* iii. 828.

Annual, very hairy. *Leaves* cordate, serrate, the lower ones five-angled, hairy. *Flowers* short-peduncled, axillary, erect. *Capsules* ovate. *Stipules* often triple.

A large annual, a native of the Circar mountains. Flowers during the rainy and cold seasons.

*Stem* erect, ramous, round, from two to three feet high, clothed with many, stiff, straight, furcate hairs. *Leaves* petioled, cordate; the large or inferior ones are often five-angled, all are somewhat pointed, grossly dentate-serrate, downy and glutinous on both sides; from two to five inches each way. *Petioles* nearly as long as the leaves, round, and armed with hairs like the stem and branches. *Stipules* single, double, or triple, filiform, hairy, falling. *Peduncles* axillary, solitary, short, erect, rigid, one-flowered. *Exterior calyx* from seven to ten-leaved, erect, spatulate. *Filaments* few. *Capsule* oval, nearly hid by the inner calyx. *Seeds* numerous, brown, downy.

12. H. *pruriens. R.*

Perennial, hairy. *Leaves* cordate, acute, from three to five-angled, serrate. *Flowers* short-peduncled, axillary, and in terminal racemes. *Capsules* pointed, hairy. It is a very large, seemingly perennial species, a native of the mountainous parts of the country. Flowers during the cold season.

*Stem* erect, short, as thick as the wrist, woody. *Branches*

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numerous, ascending; *young parts* covered with very rigid hairs; the height of the plants raised in my garden, were from six to twelve feet. *Leaves* alternate, horizontal, petioled, cordate, from three to five-angled, from three to five-nerved, serrate, from three to six inches long, and from two to five broad. *Petioles* the length of the leaves. *Stipules* subulate. *Flowers* single from the exterior axills, and on long terminal racemes, short-pedicelled, in the flowering time beautifully bowing, very large, yellow, with a dark purple bottom. *Bractes* to the flowers on the racemes three-fold, awled. *Calyx*, exterior from five to seven-leaved; *leaves* linear, hairy, permanent. *Corol* campanulate, &c. as in *populneus*. *Capsule* oblong, erect, sharp-pointed, covered with strong hairs, which stick in the skin, and produce much itching. *Seeds* many, kidney-formed.

13. H. *Solandra. L'Herit. Stirp.* i. *t.* 49.

Annual, erect, ramous, clothed with hamose pubescence. *Leaves* cordate, rarely cordate-lobate, grossly serrate. *Stipules* and *bractes* clavate. *Racemes* terminal, elongated. *Pedicels* very long. *Exterior calyx* minute, or wanting.

Laganaea lobata. *Willd.* iii. *p.* 733.

Triquera acerifolia. *Cavan. Diss.* i. *t.* 11.

A native of Mysore. Flowers during the rainy season in the Botanic garden at Calcutta.

14. H. *Lampas. Willd.* iii. 811.

Sub-arboreous. *Leaves* from cordate and entire to three-lobed. *Stipules* subulate. *Flowers* sub-terminal, forming large, leafy panicles. *Exterior calyx* of from four to eight small, subulate, caducous leaflets. *Capsule* ovate.

A native of the Rajemahl hills and Chittagong. It was also found by Dr. Buchanan in Nepal. Flowering time the close of the rains; *seed* ripens in January.

*Stems* in general several from the same root, with several, sub-erect branches, particularly near the top; *young parts*

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clothed with much stellate down. *Leaves* alternate, petioled, from sub-rotund, with the anterior margin, three-lobed on the young plants, to cordate and entire on the old; above pretty smooth, but hairy with stellate down underneath; from three to seven-nerved, with a gland on the base of the middle one only; length and breadth from two to six inches each way. *Petioles* round, ferruginous. *Stipules* subulate, caducous. *Flowers* campanulate, very large, of a bright yellow, with a very deep crimson bottom, short-pedicelled, and disposed two, three, or four alternately, on small entire, leaf-bearing branchlets, which issue from the exterior axills of the larger branches, forming a large leafy panicle. *Bractes* caducous, small, and rarely to be seen. *Calyx; exterior* of an uncertain number of small subulate, caducous leaflets; *inner* five-parted; *divisions* with subulate points. *Capsule* ovate, villous, of the size of a nutmeg. *Seeds* numerous. The young trees are now plentiful in the Botanic garden at Calcutta and very ornamental; the flowers being large, and the colour (yellow and crimson) particularly bright.

15. H. *tetralocularis. R.*

Sub-arboreous. *Leaves* cordate, three-lobed on the anterior margin, mealy. *Peduncles* axillary, bearing from one to four or more alternate flowers. *Exterior calyx* of three or four minute, caducous leaflets; the *inner* one truncated, with five remote, subulate segments. *Capsules* four-celled.

*Teling.* Condapatti.

Found on the hills of Coromandel, and is allied to H. *Lampas*, which grows on the hills of Rajemahl and on the banks of the Ganges; but differs from it in having a four-celled capsule. Flowering time, the rainy and cold seasons.

16. H. *collinus. R.*

Arboreous. *Leaves* cordate, three-lobed, repand, smooth. *Exterior calyx* of from eight to ten lanceolate, waved, per-

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manent leaflets. *Capsules* oblate, very hairy, and lined with pungent bristles.

*Teling.* Kanda-gang.

A native of the mountainous parts of the Circars, where the natives use the bark as a substitute for hemp. Flowering time the rainy season.

*Stem* arborescent. *Branches* ascending. *Leaves* alternate, petioled, slightly three-lobed, from three to five-nerved, scollopped, waved, sometimes toothed, smooth. *Petioles* round, rather shorter than the leaves. *Stipules* bristle-like, falling. *Peduncles* solitary from the axills of the exterior leaves and terminal, as long as the petioles, round, one-flowered, articulated near the apex. *Flowers* large, rose-coloured, with a dark purple centre. *Calyx; exterior* from eight to ten-leaved; *leaflets* erect, lanceolate, pointed; *margins* waved and reflexed. *Corol* flat. *Filaments* collected in verticels round their tube. *Capsule* roundish, a little oblate, five-ribbed, covered with much strong, gray, burning hair; the sutures on the inside are also thickly lined with stiff hairs.

The mountaineers use the bark of this species for cordage.

I have often observed that the bark of most of the Indian plants of this class, particularly of this family, might be employed for the same purposes as hemp. It almost always peels off in very long slips, and is very tough, that of *Abroma augusta* is particularly so, and is of the same natural order.

In India I have also often observed with admiration, that those flowers with pistils longer than the stamens, and that are not naturally pendulous, stand in an oblique, or nearly perpendicular direction; this obliquity is further assisted by the curvature of their pistils, which together with the oblique direction of the flower, generally bring their stigmas immediately below the anthers. This structure is most conspicuous in the flowers of those plants belonging to the natural order *Columnifera*, and is certainly a strong argument in favour of the *Sexual System*.

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17. H. *vitifolius. Willd.* iii. 829.

Annual, or biennial, bushy and villous. *Leaves* five-angled, lobed, grossly serrate, villous. *Flowers* axillary, solitary, drooping. *Exterior calyx* of about eight subulate leaves. *Capsules* five-winged, truncate.

Bharadwaja, the Sanscrit name.

Katu beloeren. *Rheed. Mal.* vi. *t.* 46.

*Beng.* Bun Kapash.

A native of rubbish, gardens, &c. all over India; in flower during the rainy and cold seasons.

18. H. *truncatus. R.*

Annual, erect. *Leaves* from three to five-angled, lobed, grossly serrate. *Stipules* minute. *Flowers* axillary, solitary, drooping. *Peduncles* jointed at the base. *Exterior calyx* of from six to seven, subulate leaves, half the length of the inner calyx. *Corol* sub-rotate, with petals standing distinct. *Capsule* truncated with five thin ciliate wings.

A native of Ceylon. Flowers in the rainy season in Bengal.

This plant, growing in the same place with H. *vitifolius*, which it most resembles, does not arrive to one tenth the size. The flowers are also much smaller. Both must be handled with care, as the small, sharp bristles readily enter the skin, and cause considerable uneasiness.

19. H. *scandens. R.*

Shrubby, scandent, villous. *Leaves* round-cordate, serrate-dentate, from three to five-angled. *Stipules* none. *Panicles* terminal, ramifications thereof remote, and diverging; both *calyces* five-parted.

A stout, permanent plant, a native of the forests of Chittagong, where it ruins over trees &c. It blossoms in April and May. The flowers are numerous, large, campanulate, yellow, with crimson bottom.

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20. H. *mutabilis. Willd.* iii. 817.

Arboreous. *Leaves* cordate, somewhat crenate, five-angled, downy. *Flowers* axillary, long-peduncled. *Exterior calyx* eight-leaved, half the length of the inner. *Capsules* globular, very hairy.

Padmucharinee, the Sanscrit name.

Hina paretti. *Rheed. Mal.* vi. *t.* 38—42.

*Beng.* Thul-pudma.

A native of China; both double and single are now common in gardens all over India. When the flowers first open in the morning they are nearly white; by night, a pretty deep red.

21. H. *cancellatus. R.**

Annual, erect, every part hairy and bristly; *leaves* cordate, more or less angled, crenate. *Stipules* subulate. *Racemes* terminate. *Exterior calyx* of about fifteen long incurved filiform leaflets; *inner* spathiform; *capsule* ovate.

From Nepal Dr. Buchanan sent the seed to the Botanic garden, where the plants blossom during the rainy season.

*Root* annual. *Stem* straight, with but few sub-erect, round branches, clothed with much long hair intermixed with stiff sharp bristles; height of our plants about three feet. *Leaves* petioled, cordate, generally more or less angular, crenate, very hairy; from four to six inches long, and from three to five broad. *Petioles* horizontal, nearly as long as the leaves, round, and like every other part of the plant, very hairy. *Stipules* subulate, very long and very hairy. *Flowers* numerous, peduncled, drooping, solitary in the superior axills, and on a pretty long straight, terminal raceme, large, campanulate, of a lively yellow, with the bottom of the bell crimson. *Bractes* like the stipules. *Calyx;* the *exterior* one as it were inflated, and composed of from ten to eighteen

* H. *cucullatus, Suppl.* 311. Cavanilles and Willdenow consider this a species of *Pavonia* viz. P. *cancellata.* See *Willd. ed. st.* 583.



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or twenty long, filiform, incurved, hairy permanent leaflets; the *inner* one spathiform. *Capsule* ovate, length of the exterior calyx, five furlowed, very hairy, five-celled, five-valved. *Seeds* numerous, reniform, black.

22. H. *Abelmoschus. Willd.* iii. 826.

Annual, erect, hairy. *Leaves* serrate, hairy; the *inferior* ones from five to seven-angled, lobed; the *superior* ones subpalmate. The *inner calyx* spathiform; the *exterior* one about ten-leaved.

*Hind.* Kustooree, or Kalla-kustooree.

Cutta-gasturi. *Rheed. Mal.* ii. *t.* 38.

A native of various parts of India. Flowering time the rainy and cold seasons.

23. H. *tricuspis. Willd.* iii. 830.

Arboreous, long-petioled, three-lobed, entire or crenato-dentate, pubescent, about five-nerved, with a long gland on the middle one, near the base. *Stipules* and *branches* large, semi-cordate. *Racemes* terminal, few-flowered, both calyces ten-parted. *Capsule* with five double cells.

From Otaheite the seeds were sent by the Missionaries to the Botanic garden at Calcutta, where in two or three years, the plants they produced were ten or twelve feet high, with a perfectly straight trunk to the very top, amply decorated with long, spreading branches down to the ground. All the tender parts rather sparingly clothed with whitish stellate hairs, on the base of the middle nerve is a long gland underneath; the leaves next the flowers are generally entire, and lanceolar, all are obtuse pointed, even the lobes. The inner calyx in this species is strongly marked by having ten segments, they are alternately smaller, and the capsule is ten-celled, or rather has five double cells, as in Gærtner's H. *tiliaceus*, the flowers are large, bright yellow, with a deep purple coloured bottom; they appear during the cold season

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and are very ornamental; the seed ripens early in the hot season.

24. H. *hirtus. Buch.*

Annual, erect, very hairy. *Leaves* from cordate-lobate to hastate-palmate, and finally simple and linear. *Racemes* terminal. *Exterior calyx* ten-leaved; the *inner* one spathiform. *Capsule* ovate, hairy.

Alcea moschata villosissima. *Pluk. Alm. t.* 127. *f.* 1.

A native of Mysore, from thence the seeds were sent by Dr. Buchanan to the Botanic garden where it blossoms about the close of the rains.

*Root* annual, ramous. *Stem* erect, with several spreading branches near the ground, all are round and very hairy, height of the whole plant about two feet. *Leaves* alternate, petioled; *shape* very various; the lower ones being from simple to from five to seven-lobed, about the middle of the plant hastate, or deeply three-lobed, while those near the top amongst the flowers are small, linear, and nearly entire; all but those among the flowers deeply serrate, and very hairy. *Petioles* nearly as long as the leaves. *Stipules* subulate, incurved, and like the rest of the plant hairy. *Racemes* terminal, solitary. *Flowers* large, yellow, with a red bottom. *Bractes* like stipules. *Calyx;* the *exterior* one about ten-leaved, permanent; the *inner* one spathiform, dropping with the corol. *Capsule* ovate, five-angled, very hairy. *Seeds* numerous.

This species comes nearer H. *Abelmoschus*, particularly in the pubescence, flower and pericarp, than any other I know.

25. H. *pumilus. Roxb.*

Annual, erect, downy. *Leaves* serrate; the *inferior* ones cordate, the middle ones three-lobed; the *superior* ones lanceolate. *Exterior calyx* minute. *Stigmas* hairy. *Capsule* shorter than the inner calyx.

Solandra *lobata. Nu. Syst. Veget.* 623.

This is rather a rare plant on the Coromandel coast, a na-



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tive of the borders of cultivated land; appearing and flowering in the wet and cold seasons.

*Root* ramous, annual. *Stem* erect, a little flexuose, round, downy, from two to four feet high. *Branches* few, near the ground ascending, stem-like. *Leaves* alternate, petioled, the lower ones, both on the stem and branches, cordate; the upper ones generally three-lobed, in luxuriant plants the lobes are separated to the base, and sometimes the lateral lobes are two-cleft; again those toward the summit of the plant are simply linear, the whole are acute, serrate and downy, with sometimes a few hairs; size very various. *Petioles* from one to two inches long, round, hairy. *Stipules* linear-lanceolate, in very luxuriant plants they are sometimes double or two-cleft. *Peduncles* axillary, single, erect, the length of the petioles, round, articulated above the middle, a little hairy, one-flowered. *Flowers* white, about the size of a shilling, open all day. *Calyx* minute, from six to nine-parted; the *interior* one five-cleft. *Corol; petals* obliquely-obcordate. *Filaments* numerous, short, the tube bending to one side, so as to make the stigmas below the anthers. *Style* five-cleft. *Stigmas* covered with hair, or globular leaflets. *Capsule* five-celled, five-valved, not in any respect wreathed, but just as in the genus. *Seeds* many, two rows in each cell.

26. H. *furcatus. R.*

Shrubby, very ramous, armed with sharp thorny bristles arising from coloured, glandular tuberculi. *Leaves* from entire to three-parted, grossly serrate, and hairy. *Stipules* falcate, lanceolate. *Peduncles* solitary, axillary, one-flowered; *exterior calyx* of ten forked leaflets. *Capsule* hairy, ovate, acute.

Discovered by the Rev. Dr. Carey, indigenous in the interior parts of Bengal. The seed sent by him to the Botanic garden in one year produced plants that were six or eight feet high, and blossomed during the rainy season.

*Stems* erect, somewhat ligneous. *Branches* numerous,

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expanding, armed with numerous stiff, acute, spinous, recurved bristles, issuing from small, coloured, glandular papilli; amongst the bristles, soft hairs are intermixed. *Leaves* from cordate below, to three and even five-lobed about the middle of the plant; and again near the top narrow-cordate; all are serrate and hairy; the size very various. *Petioles* almost as long as the leaves, and armed like the branches. *Stipules* falcate, lanceolate; *margins* ciliate. *Peduncles* axillary, solitary, one-flowered, shorter than the petioles, and like them armed with the same sharp bristles. *Flowers* large, yellow, with a dark crimsom bottom. *Calyx*, the *exterior* one about two-leaved, each leaflet enlarged beyond the middle; from the base of the enlargement on the upper side, issues a clavate, erect, or incurved segment; these form a cancellated dome over the inner, five-parted, rigid, glandular, bristly, hairy calyx; while the exterior broader, but shorter segments spread out horizontally. *Capsule* very hairy on the outside. *Seeds* few, from two to four in each cell.

I considered this to be *bifurcatus. Linn. Sp. Pl. ed. Willd.* iii. 819. until I reared that very plant, from seed received from the Island of Trinidad; the shrubs are nearly of the same size, but in that species every part is less hairy, the coloured glandular base of the bristles are not to be found; the *stipules* simply setaceous, and the flowers rose-coloured; consequently I must consider this a well marked distinct species, though nearly allied in the shape of the leaves and exterior calyx. Like many of the other plants of the natural order, *Columniferæ* of Linnæus, or *Malvacea* of Jussieu, the bark of this species of *Hibiscus*, yields abundance of strong, white, flaxen fibres; but the prickliness of the plant renders it very troublesome to handle.

27. H. *Surattensis. Willd.* iii. 824.

Somewhat shrubby, weak and straggling, prickly. *Leaves* from entire to palmate, serrate. *Stipules* ear-shaped. *Exterior calyx* of from ten to twelve appendicled, permanent leaf-

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lets. *Flowers* axillary. *Capsules* acute, hairy on the outside.

H. *Surattensis. Lour. Cochin Ch.* 512.

Herba crinalium. *Rumph. Amb.* iv. *t.*16. appears to me to be this plant.

Narinam-poulli. *Rheed. Mal.* vi. *p.* 75. *t.* 4. argees better with a very distinct species, *(viz. aculeata)* formerly described by me under the idea of its being *Surattensis.* At that time I had not seen the real Linnæan species, which is now before me, otherwise the mistake would not have happened. The stipules are the best marks to know them by.

A native of various parts of India. Flowers during the rainy and cold seasons in the Botanic garden.

28. H. *aculeatus. Roxb.*

Annual, erect, very prickly. *Leaves* palmate, three-lobed. *Lobes* remotely serrate. *Stipules* lanceolate. *Peduncles* axillary, solitary, one-flowered. *Exterior calyx* ten-leaved, appendaged.

I have only observed this in my garden, where it must have been brought from some other place amongst other seeds. It has proved annual with me.

*Stem* erect, very prickly, from two to five feet high, round, flexuose. *Leaves* remote, alternate, petioled, from entire to five-lobed, serrate, a little hairy; *lobes* lanceolate, pointed, principal nerves prickly on the under side. *Petioles* longer than the leaves, round, prickly. *Stipules* lanceolate, ciliate. *Peduncles* axillary, single, shorter than the petioles, prickly, one-flowered. *Flowers* large, campanulate, yellow, with a dark, purple bottom. *Calyx; exterior* articulated below the middle, and there enlarged on the outside with an oval leafy appendage below the articulation, horizontal from it, erect and incurved, covered with strong, straight, sharp bristles.

29. H. *strictus. R.*

Annual, straight, polished. *Leaves* palmate, lobate; *lobes*

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sub-rotund, acutely serrate, dentate. *Flowers* racemed, pure white throughout. *Exterior calyx* caducous; *inner* spathiform. *Capsule* linear-oblong.

Of what country this plant is a native, I have not yet been able to ascertain. It made its appearance in the Botanic garden in 1798, when many chests of plants were brought into it from the Moluccas; and I think it is more than probable, the seed came accidently amongst the earth of those plants. Be this is may, the plant thrives luxuriantly with little or no care; seed-time, the beginning of the rains; it is in blossom about their termination, and the seed ripens in December and January, soon after which the plants perish. Since writing the above, Dr. J. Glass found it wild on the Rajmahl hills.

*Root* annual, ramous. *Stem* perfectly straight, with a few straight branches, when the plants stand single, or at a distance, otherwise simple. *Bark* pale green, and uncommonly smooth. Height of the whole plant from six to fourteen feet. *Leaves* alternate, petioled, reflexed, serrate, three, five, or seven-lobed; *lobes* of a roundish-obovate shape, smooth on both sides; size very various. *Petioles* as long as the leaves, sometimes most slightly armed with minute prickles, otherwise they are very smooth. *Stipules* filiform, caducous. *Flowers* short-peduncled, solitary in the exterior axills, and on long, curved, terminal racemes, they are pretty large, and white in every part. *Calyx; outer perianth* of five or six, small, subulate, villous, caducous leaflets, dropping long before the corol expands; the *inner* one spathiform, villous; *mouth* five-toothed, deciduous. *Corol* as in the genus. *Capsule* oblong, five-angled, villous, and hairy, both without and within; while green, covered with minute, pellucid, clammy drops. *Seeds* numerous, round, hairy, and of a dark blackish brown colour.

On the coast of Coromandel I have often seen a species, which I think agrees better with all the descriptions and figures of H. *ficulneus* that I have met with, than the above described, otherwise I might have taken it for that plant.

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Like many other of the malvaceous tribe, the bark of this species abounds in flaxen fibres; but in none have I found so large a quantity, equally beautiful, long, glossy, white, fine and strong, as in this. To these promising qualities may be added the luxuriant growth, and habit of the plant, rendering it an object deserving of every care and attention, at least until the real worth of the material is fairly ascertained.

From several years experience, I find the best season for sowing the seed in Bengal, is just when the first rains begin; which is generally in May, in beds; and when the plants are about six inches high, transplant them out in rows, about nine inches asunder, and about as much from each other in the rows. In 1801, I had forty square yards planted in this manner, which yielded thirty-three pounds weight of the naturally very clean fibres.

30. H. *prostratus. R.*

Annual, with little or no stem, but many, very long, procumbent, scarcely armed branches. *Leaves* from three to five-lobed; *lobes* obovate, serrate. *Stipules* subulate. *Racemes* terminal. *Flowers* white, with a rose-coloured bottom. *Exterior calyx* from five to six-leaved, caducous; the *inner* one spathiform. *Capsule* oval, villous.

A native of the Circars, where it blossoms during the cold season. Compare with Lamarck's H. *ficulneus.*

31. H. *diversifolius. Willd.* iii. 820.

Perennial, bushy, prickly. *Leaves* from sub-lobate to palmate, serrate. *Exterior calyx* from eight to nine-leaved, both are very bristly.

A native of the eastern coast of Africa, and Madagascar. In the Botanic garden at Calcutta, it blossoms and ripens its seed during the cold season.

32. H. *cannabinus. Willd.* iii. *R. Corom. Pl.* ii. *N.* 190.

Annual, straight, nearly simple, slightly armed. *Leaves*

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serrate; the inferior cordate; towards the middle of the plant palmate, with lanceolate, acute lobes; at the top simply linear-lanceolate. *Stipules* subulate. *Flowers* axillary, short-peduncled. *Exterior calyx* of seven subulate leaves; the *inner* one bristly and glandular.

*Beng.* Mesta pat.

*Hind.* Puloo.

*Teling.* Gung-kura.

Native place uncertain. Cultivated during the rainy season. The leaves are used as a pot herb, and the bark for hemp.

33. H. *radiatus. Willd.* iii. 824.

Perennial, prickly. *Leaves* palmate; *lobes* lanceolate, serrate. *Stipules* ensiform. *Flowers* axillary. *Calyx* bristly, the *exterior* one of eight or ten, linear, sub-bifurcated divisions.

Native place uncertain, but it is common in gardens about Calcutta, where it blossoms during the cold season.

*Stem* short, scarcely ligneous, though existing two or three years. *Branches* numerous, spreading, and ascending, armed with small prickles; generally the length of the plant, from five to six feet. *Leaves* alternate, palmate, rarely simple; *lobes* generally five in young plants, in old ones fewer, and broader-lanceolate, deeply and acutely serrate; smooth on both sides, from four to five inches long, by one broad. *Petioles* armed, and nearly as long as the leaves. *Stipules* ensiform. *Flowers* axillary, solitary, short-peduncled, very large; the exterior two thirds of the petals yellow, and spreading horizontally; the inner third deep crimson, and formed into a bell. *Calyx*; the *exterior* one of from eight to ten narrow-linear, bristly segments, which like H. *furcatus*, and *bifurcatus*, have each a small additional segment, growing from the disk a little within the apex; the *inner* calyx five-cleft, longer than the exterior bristly segments, three-ribbed, and rather without the large gland in the middle of each, as in H.



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*cannabinus*, and this is one of the best marks to distinguish them by.

It is an elegant plant when in blossom, the flowers being amongst the largest of the genus and the colours bright.

34. H. *longifolius. Willd.* iii. 857.

Annual, bristly. *Leaves* palmate, serrate; *lobes* lanceolate. *Flowers* axillary, solitary. *Exterior calyx* of from eight to ten linear leaflets; the *interior* one spathiform. *Capsules* subcylindric. *Seeds* numerous.

*Beng.* Dharoos.

*Teling.* Bendee.

*Hind.* Ram toorai.

I have not found this plant wild. It is much cultivated throughout India, in the gardens of both natives and Europeans.

*Root* ramous, annual. *Stem* erect, ramous, from three to six feet high, round, towards the base somewhat ligneous, and in a good soil as thick as a man's wrist, tender parts covered with sharp bristles and often spotted with purplish specks. *Leaves* alternate, petioles the inferior ones only angular, about the middle of the plant palmate, while the superior ones are sub-digitate, with the divisions lanceolate-oblong, all are serate, and somewhat bristly; the general size of the whole leaf is from eight to twelve inches each way. *Petioles* round, bristly, as long as the leaves, generally more coloured then the stem, or branches. *Stipules* often paired. *Flowers* axillary, solitary, short-peduncled, very large, pale yellow, with a dark crimson bottom. *Calyx;* the *exterior* one from six to twelve-leaved; *leaflets* linear, bristly, caducous; the *interior* one spathiform, bursting on one side, of a remarkably soft texture. *Corol, stamens*, and *germ* as in the genus. *Stigmas* as many as the cells in the capsule. *Capsule* from six to twelve inches long, and about one in diameter, somewhat bristly, particularly the ridges, their number corresponding with that

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of the cell, and valves, viz. from five to eight, with a single row of round, smooth seeds in each cell.

This is one of the best, if not the best of the esculent herbs of India; the plant is easily raised from seed, and produces abundance of fruit, the only part which is eaten. The whole plant, particularly the capsules, is replete with much mild mucilage, which I consider as highly nourishing as well as mucilaginous, and might no doubt be employed to advantage in all diseases requiring emollients and demulcents. Some tender branches placed in water for examination soon rendered it gelatinous, almost as much so as if the branches of *Pedalium murex* had been standing in it. Dr. Cullen observes that coughing is often caused by acrid vapour, rising from the lungs irritating the glottis, and its neighbourhood; that by besmearing these parts with demulcent matter, we often lessen the irritation and frequency of coughing. A mild, palatable, culinary preparation of the very young capsules of this plant, would, I think, stand as fair a chance to answer this intention as any thing I know, and at the same time prove a nourishing part of the diet.

The stigmas are replete with a very beautiful deep purple juice, which they communicate to paper, and which is tolerably durable.

H. *esculentus*, the West India *Okra* possesses virtues nearly similar, through I believe inferior; this I have also cultivated for many years in the Botanic garden, and it differs from this very conspicuously, both in the shape of the leaves and capsules.

35. H. *tetraphyllus. R.*

Annual, erect, ramous, hairy. *Leaves* palmate; *divisions* variously lobate, and acutely dentate. *Stipules* and *bractes* lanceolate. *Flowers* racemed. *Exterior calyx* four-leaved. *Capsules* linear-oblong, hairy.

A large, racemous, annual species, of from four to five feet



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high, found about Calcutta. Flowering time, the wet and cold seasons.

*Stem* erect, armed with very stiff short hairs, as well as the branches. *Leaves* palmate, hairy, and scabrous; *lobes* variously lobed, and dentate. *Petioles* round, longer than the leaves. *Stipules* lanceolate. *Flowers* large, yellow, campanulate, nodding on long terminal racemes, and from the exterior axills. *Calyx*, the *exterior* one four-leaved. *Capsule* ovate-oblong, five-sided, armed with much very stiff hair.

36. H. *chinensis. R.*

Annual, erect, hairy. *Leaves* palmate; *segments* from three to seven, sub-lanceolar, obtusely serrate, and obtusely acuminate. *Flowers* axillary and terminal; the *exterior calyx* from six to eight-leaved; the *interior* one spathiform. *Capsules* oblong, five-angled, hairy.

From China it has been introduced into the Botanic garden where it flowers and ripens its seed during the rainy and cold seasons. It has the habit of *Abelmoschus;* but the leaves are much more divided, and though the capsules are exceedingly like those of that species, yet the seeds are smaller, and void of the musky scent.

37. H. *pentaphyllus. R.*

Annual, erect, nearly smooth. *Leaves* deeply palmate, sometimes hastate; *divisions* linear, near the apices dentate. *Stipules* ensiform. *Exterior calyx* five-leaved, permanent; the *inner* one spathiform and deciduous. *Capsule* linear-oblong, hairy.

Reared in the Botanic garden from seeds received from Mr. Kerr at Canton in China; here it blossoms during the latter part of the rains.

*Root* annual. *Trunk* straight and almost destitute of branches, pretty smooth, the thickness of a man's finger, and about six feet high. *Leaves* alternate, petioled, deeply palmate; in old plants young shoots are produced with the leaves

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less divided, even three-lobed; *divisions* linear, near their apices dentate, pretty smooth on both sides; length and breadth of the whole leaves, from six to eight inches. *Petioles* shorter than the leaves. *Stipules* ensiform. *Flowers* terminal, and solitary from the terminal axills, peduncled, large, drooping, yellow. *Calyx*, the *interior* one constantly of five, large, ovate, permanent leaflets; the *inner* one spathiform, a little hairy, deciduous. *Capsule* linear-oblong, when ripe five-seeded, hairy.

38. H. *pungens. R.*

Perennial, erect, ramous, every part armed with acute bristles. *Leaves* palmate; *division* linear-lanceolate, somewhat lobate, and deeply dentate-serrate. *Stipules* ensiform. *Racemes* terminal. *Exterior calyx* four-leaved, permanent. *Capsule* slender, acuminate, hairy, longer than the calyx.

From Nepal Dr. Buchanan sent the seeds to the Botanic garden, where the plants blossom about the close of the rains and in the cold season.

*Stem* erect, as thick as a walking cane, and often continuing for two or more years. *Branches* ascending, all are round, green, and densely clothed, as is every other part of the plant, with innumerable, diverging, strong, acute bristles; which enter the skin like spines. *Leaves* long-petioled, alternate, palmate; *lobes* linear-lanceolate, often lobate, and always deeply serrate-dentate; length and breadth of the whole leaf, from six to eight inches. *Stipules* broad-ensiform, or sub-lanceolate. *Racemes* terminal. *Flowers* drooping, rather short-pedicelled, large, deep yellow. *Bractes* like the stipules. *Calyx;* the *exterior* one of four, large, broad-ovate, permanent leaflets; the *inner* one five-toothed. *Capsule* of a long, thin, tapering, conical form, and much longer than the calyces.

39. H. *heterophyllus. Vent. Mal. p.* 103. *t.* 103.

Arboreous. *Trunk* straight, armed. *Leaves* from palmate

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on young plants, to simple on the old; all are linear-lanceolate, and serrate. *Flowers* axillary, solitary. *Exterior calyx* of about ten subulate, permanent leaflets; the *inner* one five-cleft. *Capsules* oval, hairy.

A native of New South Wales. Flowers during the hot season in the Botanic garden.

*PAVONIA. Schreb. gen. N.* 1140.

*Calyx* double; the *exterior* one many-leaved. *Stigmas* ten. *Capsules* five, two-valved, one-seeded.

1. P. *Zeylanica. Willd.* iii. 838.

Erect, ramous, clothed with clammy pubescence. *Leaves* deeply three-lobed; *lobes* lanceolate, and notched. *Stipules* subulate. *Peduncles* axillary. *Exterior calyx* of from eight to twelve subulate, hairy leaflets. *Stamina* fifteen.

Hibiscus *Zeylanicus. Linn. Flor. Zeyl.* 226. *Burm. Flor. Ind.* 153. *t.* 48. *f.* 3.

Alcea pentacoccos. *Pluk. Alm.* 13. *t.* 125. *f.* 3. good.

A native of Coromandel. Flowers during the rainy and cool seasons.

2. P. *odorata. Willd.* iii. 837.

Erect, ramous, covered with clammy pubescence. *Leaves* round-cordate, angle-lobed, dentate. *Peduncles* axillary. *Exterior calyx* from ten to twelve-leaved. *Stamina* fifteen.

*Teling.* Chittle-bunda.

A native of Coromandel. In the Botanic garden at Calcutta, it is in flower all the year.

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# CLASS XVII.

## DIADELPHIA TRIANDRIA.

*TAMARINDUS. Schreb. gen. N.* 1100.

*Calyx* four-leaved. *Corol* three-petalled, unilateral. *Legume* pulpy.

T. *indica. Willd.* iii. 577.

Balam-pulli. *Rheed. Mal.* i. *t.* 23.

Amlica. *Asiat. Res.* iv. 247.

Tintri, or Tintiree, are also Sanscrit names.

*Beng.* Tintiree, or Tintil, or Tentool.

*Hind.* Umli, Amli.

Chinta-chittoo of the Telingas.

This most magnificent tree is so common and so generally known, as to require little or no description. I however suspect our East India tree differs, probably specifically, from that of the West Indies; besides I have in view, the reducing of it to its proper place in the *Sexual System*, which I conceive to be in the Class *Diadelphia*, and not *Monadelphia*, as arranged by Schreber, Willdenow, &c. It posseses the natural classic character of the former in an eminent degree, and scarcely any part of the latter; should the single circumstance of the filaments being united in one body towards the bottom, constitute the essential mark, it would undoubtedly be a monadephous plant, but we know that almost one half of the genera of this, (the 17th Class) have the stamens connected into one body towards their base; yet I do not know of any one who has attempted to remove such, or even to consider them as monadelphous.

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Flowering time the hottest part of the year, which is generally in May. Fruit ripens during the cold season, or from December till February.

The tree is one of the largest in India, with a most extensive, large, shady head, or coma, the bark dark-coloured, and scabrous, the wood hard, very durable, and most beautifully veined.

*Leaves* pinnate. *Leaflets* from ten to fifteen pair, opposite, sub-sessile, tapering a little, entire, obtuse, smooth on both sides, the inferior pair larger. *Petioles* channelled, from four to six inches long. *Stipules* small, caducous. *Racemes* terminal, and lateral. *Bractes* obovate, coloured, one-flowered, caducous. *Calyx* four-leaved, cruciate, expanding, deciduous. *Corol* sub-papilionaceous, erect, unilateral, the length of the calyx. *Banner*, or middle petal oblong; *margins* involute and curled. *Wings* oval, margins curled, all three are beautifully variegated with red and yellow; *keel*, two short subulate petals, or filaments under the stamens; these were considered nectarial, and formed a part of the essential generic character. *Filaments* three, conjoined, inserted under the germ, ascending. *Anthers* incumbent. There are the rudiments of four more filaments in the fissures and outsides of the three fertile ones. *Germ* pedicelled, linear, with the style much incurved. *Legume* pendulous, nearly linear, generally curved, somewhat compressed, replete with firm, acid pulp, covered with a hard, scabrous bark, which never separates into valves; nor could I ever observe any suture indicating such a division; under the bark run three nervous fibres, one down the upper concave margin, and the other two at equal distances from the inferior, or convex edge. *Seeds* from six to twelve, somewhat trapeziform, compressed, covered with a smooth, hard, brown bark, and inserted into the inferior, or convex side of the pericarp.

Extract of a letter from Captain (now Colonel) Pringle at Lucknow.

"Inclosed I beg leave to send you a specimen of the red

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Tamarind, which I believe is unknown in Bengal; at least I never saw it until I came to this part of the country.

"This Tamarind makes a very fine preserve, and yields a beautiful deep red colour, approaching to a purple."

The leaves are eaten in the curries of the natives, the pulp of the fruit is universally known. The seeds ground into a flour, are boiled into thick conjee, and used as an article of diet by the poor in times of scarcity or famine; of the same flour a tenacious paste is made, which serves for various economical uses.

The kernels of the Mango are large, and seem to contain much nourishment; however they are made no use of, except like those of the Tamarind, in times of scarcity and famine; they then are boiled in steam, and used as an article of diet.

## DIADELPHIA HEXANDRIA.

*FUMARIA. Schreb. gen. N.* 1154.

*Calyx* two-leaved. *Corol* ringent. *Filaments* two, each bearing three anthers.

F. *parviflora. Willd.* iii. *p.* 868.

Annual, diffuse. *Leaves* super-decompound, with smooth, filiform divisions. *Flowers* racemed. *Stigma* bifid; *pericarp* round, with one round hard seed.

*Beng.* Bun Sulpa.

A native of Bengal, where it appears very common on cultivated lands in the vicinity of Calcutta, during the cold season. It has the habit of F. *officinalis* but in the Indian plant, the ultimate segments of the leaves are filiform and the stigma bifid.



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## DIADELPHIA OCTANDRIA.

### *POLYGALA. Schreb. gen. N.* 1154.

*Calyx* of five leaves, two of them large and coloured. *Legume* obcordate, two-celled.

1. P. *arvensis. Willd.* iii. 376.

Procumbent; *root* perennial. *Leaves* linear-lanceolate, hairy. *Racemes* axillary, solitary; *flowers* crested. *Seeds* hairy.

*Hind.* Meradoo.

A small, procumbent, triennial, or perennial plant, a native of pasture lands. Flowers during the rainy season.

*Stem* several, diffuse, with their extremities ascending, round, a little hairy, about a foot long. *Leaves* alternate, very short-petioled, linear-lanceolate, recurved, margins revolute, a little hairy, from one to twelve inches long, the inferior leaves are broader and shorter. *Racemes* solitary, axillary, or a little above, as long as the leaves. *Bractes* three-fold, one-flowered. *Flowers* small, orange-coloured. *Calyx* five-leaved, the three exterior ones small, the two interior, or lateral ones, formerly called the wings of the corol, large, all are oval and pointed. *Banner* two-petalled, or they may be called wings, and then there will be no banner, sub-erect, obovate. *Keel* bearded. *Stamens* in one body, dividing into eight filaments. *Germ* obcordate. *Style* long, projecting, thickening. *Stigma* large, clubbed, incurved. *Seeds* hairy.

2. P. *telephioides. Willd.* iii. 376.

Procumbent; *leaves* oval, smooth. *Racemes* scattered between the leaves; *flowers* crested. *Seed* very hairy.

This species differs from the last in the following points, for the plants are in size and appearance the same, but in this the leaves are smooth, and oval, or at most oblong, the racemes are scattered over the branchlets between the leaves, and not axillary, and the seeds are very hairy.

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3. B. *undulata. R.*

Annual, ramous. *Leaves* alternate, ovate-cordate, much waved, from three to five-nerved. *Spikes* terminal; *flowers* crested. *Capsule* reniform, *margins* prickly.

A native of Prince of Wales' Island.

*SECURIDACA. Schreb. gen. N.* 1156.

*Calyx* three-leaved. *Corol* papilionaceous, with the banner two-leaved, without the wings. *Legume* (*capsule*) ovate, one-celled, one seeded, ending in a ligulate wing.

S. *paniculata. R.*

Shrubby, scandent. *Leaves* oblong. *Panicle* terminal and axillary. *Flowers* crested, as in many of the *Polygalas.*

Ferinjer, the vernacular name in Silhet, where, as well as Chittagong, it is indigenous, growing to be a large, very ramous, bushy shrub. Flowering in August, and the seed ripening in April.

*Stem* stout and woody, covered with smooth, olive-coloured bark. *Branches* numerous, extremities drooping, round and smooth, even polished. *Leaves* alternate, bifarious, short-petioled, oblong, entire, acute, smooth on both sides, coloured, from three to four inches long, and from one to two broad. *Petioles* very short, and inserted on a brown, glandular receptacle, which has a pit on each side, and no other stipula. *Panicles* terminal with smaller ones from the exterior axills, large, ramous, open. *Flowers* numerous, but standing single, long-pedicelled, small, red. *Calyx* three-leaved. *Leaflets* ovate-oblong, one incumbent, and two under the flower laterally. *Corol* sub-papilionaceous, five-petalled, the two largest inserted on the sides, and from the banner, exterior; they are oval, and taper at the base, spreading out, and ascending; the interior three, two of them the wings, spatulate, and inverted on the posterior sides of the boat-shaped, one-leaved, crested carina, all are curled on the margins and



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beautifully veined. *Filaments* eight in one body. *Anthers* oblong. *Germ* sessile, oval, protruded under the style, one-celled, and containing a single ovulum, attached to the apex of the cell. *Style* the length of the stamina, ascending. *Stigma* glandular. *Capsule* superior, from turbinate to oval, entire, one-celled, evalvular, ending in a very large substantial wing in the erect shape of a chopping-knife. *Seeds* solitary, oval, or somewhat obovate, attached to the top of the cell, and round the insertion partially arilled. *Integument* single, thin, and firmly attached to the embryo. *Perisperm* none. *Embryo* conform to the seed, inverse. *Cotyledons* of a softish, yellow, waxy consistence, and yellow colour. *Plumula* of two obtuse lobes. *Radicle* minute, superior.

## DIADELPHIA DECANDRIA.

### *DALBERGIA. Schreb. gen. N.* 1158.

*Legume* pedicelled, membranaceous, not opening spontaneously, but crumbling to pieces by age. *Seeds* one or more.

*Note.* The stamina disagree so much in the different species of this very natural family as to render their forming any part of the *essential generic character* inconvenient. The fruit alone appears to be sufficient, to which may be added the alternately pinnate leaves.

1. D. *Oojeinensis. Roxb.*

*Leaves* ternate; *leaflets* sub-rotund. *Racemes* terminal, and axillary. *Flowers* three-fold; *stamens* one and nine. *Legume* linear.

From seeds received in 1795 into the Botanic garden at Calcutta from Dr. William Hunter, the surgeon to the Resident at Oojein, two young trees have been reared. In March and April they blossom, when nearly destitute of leaves. The seed ripens in September and October.

*Trunk* tolerably straight, crowned with numerous spread-

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ing branches and branchlets, the height of the trees in fourteen years, thirty-five feet. *Bark* of the trunk dark brown, and deeply cracked, of the younger parts smoother. *Leaves* alternate, petioled, ternate, the whole length often extends to twelve inches. *Leaflets*, the exterior one nearly round, with an obtuse point, length about seven inches, and about six broad; lower pair obliquely ovate-cordate, obtuse-pointed; about four inches long, and three broad; *margins* of all scolloped, and much waved, of a firm texture, smooth above, and a little villous underneath. *Racemes* axillary, and terminal, rarely compound. *Pedicels* three-fold, slender, coloured, villous, one-flowered. *Bractes; common* of the pedicels, solitary, sub-reniform, small, villous, caducous; *proper* of the pedicels, solitary on the outside of the base of each; of the calyx, still smaller but oblong, and pressing upon it laterally. *Flowers* numerous, rather small, of a very pale rose-colour, indeed almost white, somewhat fragrant. *Calyx* sub-bilabiate; the *upper* division oblong, bidentate; the *under* one three-parted. *Corol* papilionaceous. *Banner* sub-rotund. *Stamina*, a single one above, and below nine united. *Anthers* sub-rotund. *Germ* linear, with the rudiments of eight or nine seeds. *Style* short. *Stigma* headed. *Legume* linear-oblong, obtuse, veined, and villous on the outside. *Seeds* one, two or three, reniform, compressed.

The wood of this very large tree, Dr. Hunter informs me, is highly valued for various purposes.

The pillars of Madajee Scindia's palace, at Oojein, are made of it.

2. D. *latifolia. Willd.* iii. 902. *R. Corom. pl.* ii. *No.* 113.

*Leaflets* from three to seven, sub-alternate, roundish, emarginate. *Panicle* axillary. *Filaments* ten, coalesced into one body. *Legume* one-seeded.

*Teling.* Viroogoodu-charva.

*Eng.* Blackwood tree.

*Beng.* Sit-sal.

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This is one of our largest mountain trees. Flowers during the wet season. The seeds ripen in February and March.

*Trunk* erect, though rarely straight, often very thick and rising to a very great height. *Branches* spreading, very numerous, forming a large, shady head. *Leaves* alternate, pinnate, with an odd one, from six to nine inches long; *leaflets* from three to seven, generally five, alternate, the exterior ones largest, roundish, emarginate, a little waved, above smooth, covered with a little whitish down underneath, generally about two inches each way. *Petioles* round, smooth. *Stipules* none. *Panicles* axillary, small, erect. *Flowers* small, white. *Calyx* hoary, five-toothed. *Filaments* ten, united into one, open above. *Anthers* twin, singly globular. *Germ* pedicelled, smooth. *Stigma* simple. *Legume* pedicelled, lanceolate, thin, brittle, when ripe crumbling away, not opening spontaneously, about an inch broad, and two and a half or more long. *Seed* generally but one in the centre of the legume, reniform, smooth, compressed, brown, of the size of a very small French bean.

The wood of the centre of the trunk and large branches of this tree, is what is commonly called black wood, and is almost universally used for making furniture; its colour is a greenish or greenish black, with lighter coloured veins running in various directions, which gives it that beautiful appearance, so much admired; it is rather heavy, sinking in water, close-grained, and admitting of the finest polish. On the Malabar coast this tree must grow to an immense size, as I have seen planks from thence, full three feet and a half broad, and if we allow nine inches of white wood to have been on the outside of these trees, the circumference must have been fifteen feet exclusive of the bark.

In Bengal, where the tree is common, the wood is known by the name Sit-sal, and is certainly not so heavy as that on the coast of Coromandel and Malabar, though fully as beautiful, and very much used for furniture.

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3. D. *Sissoo. Roxb.*

*Leaflets* about five, alternate, round, acute. *Panicles* axillary. *Filaments* nine, equally coalesced into one. *Legume* lanceolate.

*Sans.* Shingshupa.

*Hind.* and *Beng.* Sissoo.

A native of Bengal, and of the adjoining provinces to the northward. Flowering time the beginning of the hot season; the seed ripens about the close of the year.

*Trunk* generally more or less crooked, high and of great thickness, often from three to four feet in diameter. *Branches* numerous, spreading in every direction; *branchlets* bifarious. *Young shoots* downy and always drooping, even the leading one. *Bark* on young trees ash-coloured and pretty smooth, when old uncommonly thick, and very deeply cracked in every direction. *Leaves* alternate, bifarious, pinnate. *Leaflets* alternate, generally from three to five, sub-orbicular or obcordate, pointed, waved, when young downy, when old smooth and shining; from one to twelve inches each way, the inferior ones smallest. *Petioles* round, waved, very downy when young, smooth when old. *Stipules* lanceolate, caducous. *Panicle* axillary, downy, composed of numerous, short, subsecund spikes. *Flowers* small, of a yellowish white. *Bractes* small, caducous. *Calyx* campanulate, hairy; the upper two divisions rounded, the under three acute. *Corol* as in the genus. *Filaments* nine, equally coalesced for two-thirds their length, thin, alternate, shorter with roundish anthers. *Germ* pedicelled. *Style* very short. *Stigma* large, glandular. *Legume* linear-lanceolate, membranaceous, three-seeded. *Seeds* compressed; reniform.

This tree yields the Bengal ship-builders their crooked timbers and knees. It is tolerably light, remarkably strong, but unfortunately not so durable as could be wished. It answers well for various other economical purposes; the colour, a light grayish brown, with darker coloured veins. Upon the whole I scarcely know any other tree that deserves more attention,

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for when its rapid growth in almost every soil, its beauty, and uses are taken into the account, few trees can be compared with it.

4. D. *emarginata. R.*

*Leaflets* from five to seven, alternate, round, obcordate, emarginate. *Panicle* axillary, and terminal. *Filaments* nine, coalesced in one. *Legume* linear-lanceolate, from two to four-seeded.

A native of the Andaman Islands, from thence introduced into the Botanic garden in 1760, by Colonel Alex. Kyd. In 1809, the largest of the trees was from forty to fifty feet high, and thick in proportion, viz. from forty to forty-five inches in circumference, four feet above the ground. They blossom in September; and the seed ripens in March, at which time the trees are destitute of leaves in Bengal.

*Trunk* nearly straight. *Bark* tolerably smooth and of a dirty gray colour. *Branches* numerous, spreading and dividing in every direction, so as to form one of our most shady trees. *Leaves* alternate, bifarious, pinnate, from six to eight inches long. *Leaflets* generally five or seven, sub-alternate, short-petioled, round-obcordate, emarginate, very smooth, and highly polished on both sides, but much paler underneath, general size about an inch each way for the lower ones, and an inch and a half for the most exterior ones. *Petioles* and *petiolets* round, slender and smooth. *Stipules* minute, caducous. *Panicles* axillary, and terminal, shorter than the leaves, ramifications alternate, bifarious, smooth. *Flowers* numerous, small, alternate, pedicelled, pure white, fragrant. *Calyx* smooth; *upper* two divisions broader, shorter and more united. *Filaments* nine, united into one body with a fissure down the back. *Anthers* twin. *Germ* linear-oblong, pedicelled. *Style* short. *Legume* lanceolate, with generally from one to three seeds.

In habit it much resembles *Dalbergia Sissoo;* the most conspicuous specific difference is in the leaves; in this they are

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emarginate, in that pointed; I may also add that the bark in in this is smooth, in that deeply cracked. Colonel Alexander Kyd, who brought the young tree from the Andaman Islands, in a latter dated October 1801, says, "I remember the trees perfectly well, I brought them from the Andamans. We there looked upon it as a kind of *Sissoo*, and it was by far the most valuable kind of wood we had on the Island, as it grew to a very large size, and was well suited for shipbuilding. It has very much the appearance of *Sissoo* when cut, but is of a more uniform colour and rather darker; in fact, like very dark coloured oak. It grows in common on the high grounds, with wood oil, and red wood trees, and all the other varieties of trees that are at the Andamans, but seems by no means a very common tree. Captain Blair built a vessel at the Andamans called the Union, and employed as much of this timber on her as he could procure, but as this vessel is unfortunately gone to the bottom, there is no finding out whether it is a durable timber or not."

The timber of the young trees in the Botanic garden is considerably harder and closer in the grain, than that of *Sissoo* of the same size, and its growth much slower.

5. D. *alata. R.*

Arboreous. *Leaflets* about three pair, opposite, linear-oblong, polished. *Panicle* terminal. *Filaments* single and nine-cleft. *Legume* linear, with a short polished wing all round.

Found by Mr. William Roxburgh in the state of a small tree in the forests of Pulo Pinang.

6. D. *parviflora. R.*

*Leaflets* from three to four pair, alternate, broad-lanceolate, entire, smooth. *Panicles* terminal, corymbiform. *Bractes* round, ciliate. *Stamina* in one body. *Legume* falcate, one or two-seeded.

A native of the Moluccas, and by far the smallest flowered species I have yet found.



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7. D. *reniformis. R.*

*Tender parts* ferruginous. *Leaflets* from five to eleven, alternate, lanceolate. *Panicles* axillary and lateral. *Stamina* in two five-cleft bodies; *legumes* reniform with thick, rounded margins.

Kures, the vernacular name in Silhet, where it is indigenous; grows to be a large, crooked, bushy tree, the wood yields a greenish flame, and is reckoned the best for burning the lime stone of that district. Flowering time March; and the seed ripens in December.

*Young shoots*, &c. tender parts densely clothed with a thick coat of ferruginous down. *Leaves* alternate, pinnate, about six or eight inches long. *Leaflets* generally from five to seven, or nine; rarely eleven, sub-alternate, short-petioled, lanceolate, entire, while young villous underneath, at all other times perfectly smooth, and of a firm texture; two inches long, and one broad. *Stipules* subulate, villous, caducous. *Panicles* axillary, and below the leaves, and generally shorter than them, very downy, composed of a few, many-flowered, simple branches. *Calyx* sub-campanulate, and like the panicle, clothed with ferruginous down. *Corol* as in the genus. *Stamina* in two, equal, five-cleft bodies. *Anthers* nearly round, two-lobed. *Germ* pedicelled, generally two or three-seeded. *Style* incurved. *Stigma* simple. *Legumes* generally of one reniform joint; and one-celled, compressed, but with thick rounded margins; about an inch long, and three quarters of an inch broad. When the legume has a second joint, it is like the anther. *Seed* solitary, reniform, &c. as in the order.

8. D. *frondosa. Roxb.*

*Bark* smooth. *Leaflets* about five pair, alternate, oval, emarginate. *Stipules* falcate. *Panicles* axillary. *Stigma* in two equal bodies. *Legume* from two to three-seeded.

A native of Ceylon, and the Peninsula of India. In the

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Botanic garden the trees blossom in May and June, and the seed ripens in September and October.

*Trunk* erect, and in a tree only seven years old, three feet in circumference; the *bark* is particularly smooth, and light ash-coloured. *Branches* spreading, nearly horizontal, with numerous, alternate, bifarious branchlets, forming a large, dense crown; general height of the tree thirty feet to the top. *Leaves* alternate, bifarious, pinnate, from six to twelve inches long. *Leaflets* alternate, short-petioleted, about five on each side, oval, emarginate, smooth, about an inch or an inch and a half long, and one broad, deciduous during the cold season, and appearing with the flowers in May and June. *Stipules* lanceolate-falcate, caducous. *Panicle* axillary, solitary, shorter than the leaves, composed of a few alternate, bifarious, ascending, simple, secund, villous branches. *Flowers* pale blue, small, disposed in two approximate, unilateral rows on the convex or outside of the branches of the panicle. *Bractes* small, lanceolate, villous, caducous at a very early period, the largest one below each pedicel, and two pressing the calyx laterally. *Calyx* bilabiate; the *upper lip* bidentate; the *under* one tridentate, the middle one longer. *Filaments* in two, equal, five-cleft bodies. *Germ* pedicelled, one-celled, four-seeded. *Style* shorter than the germ, rising at a right angle from it, smooth. *Stigma* minute, smooth. *Legume* pedicelled, not opening, lanceolate, from one to four-celled, one or two most frequent. *Seeds* obliquely-reniform, compressed, smooth. *Perisperm* none, &c. as in other *Leguminosæ*.

It is a quick growing, large, beautiful tree, and the timber useful for many purposes.

9. D. *paniculata. Willd.* iii. 903. *Roxb. Corom. pl.* ii. *No.* 114.

*Leaflets* from five to six pair, alternate, obovate-oblong, emarginate. *Panicles* terminal, one or two-seeded.

Patsuroo is the Telinga name.



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This is also a large tree, and a native of the same mountains as the preceding species. Flowers about the beginning of the hot season.

*Trunk* erect. *Bark* pretty smooth, of a light ash-colour. *Branches* numerous, spreading, forming a very fine, close, shady head. *Branchlets* ascending. *Leaves* alternate, bifarious, pinnate, with an odd one; from four to five inches long. *Leaflets* generally from three to five pair, alternate, oblong, smooth, often emarginate, nearly equal, about one inch and a half long, and about one broad. *Stipules* lanceolate, falcate. *Panicles* terminal, leafy, large, generally bifarious; ramifications alternate, round, downy. *Flowers* numerous, small, white, with a faint tinge of blue. *Calyx* of a deep blackish purple, and hairy. *Wings* as long as the banner. *Keel* half the length of the wings, two-petalled, only slightly united for a little way at the middle. *Filaments* two, lateral, equal, ascending, each divided into five. *Anthers* twin, singly globular. *Legume* lanceolar. *Seed* generally single.

*Note.* The wood of this tree is white, and firm to appearance, but less useful than some of the other species.

10. D. *zeylanica. R.*

*Bark* cracked. *Leaflets* six-paired, alternate, cuneate-oblong; emarginate. *Stipules* oblong. *Panicles* axillary. *Legume* lanceolar, from one to three-seeded.

*Cing.* Beloo-labba.

A large, elegant timber tree, a native of Ceylon; from thence sent to the Botanic garden by General Hay Macdowall in 1801; where in six years, they began to blossom in May and June, and the seed ripened in September and October.

11. D. *ferruginea. Roxb.*

*Leaflets* from six to eight pair, alternate, oblong, emarginate. *Stipules* and *bractes* from broad obovate, to linearly

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cuneate. *Panicles* axillary. *Filaments* in two equal bodies. *Legume* lanceolate, from two to four-seeded.

A native of the Islands east of the Bay of Bengal. *Tender branchlets* clothed with ferruginous down. *Leaves* alternate, pinnate, from four to six inches long. *Leaflets* six or eight pair, alternate, sub-sessile, linear-oblong, emarginate, a little hairy, nearly one inch long, and scarcely half so much broad. *Stipules* broad obovate; *apex* almost premorse, downy. *Panicles* axillary, shorter than the leaves; *racemes* simple, secund, and ferruginous. *Bractes*, the larger one under each division of the panicle like the stipules; those of the flowers also solitary, one-flowered, and narrower; those of the calyx, one on each side, narrow-cuneate. *Flowers* numerous, small. *Calyx* hairy; *upper lip* of two rounded lobes; *lower* of three long, acute segments. *Filaments* ten, in two equal bodies. *Anthers* broadly two-lobed. *Germ* pedicelled, margins hairy. *Legume* lanceolate, from two to four-seeded.

12. D. *Krowee.*

Arboreous. *Leaflets* from ten to eighteen pair, sub-opposite, oblong. *Racemes* axillary, solitary. *Filaments* one and nine. *Legumes* linear, black, sharp, from four to eight-seeded.

Krowee, is the vernacular name in Silhet, where the tree is indigenous, and grows quickly to a large size, yielding timber of a dark brown colour, and rather too porous for furniture, but seems very fit for various other purposes. Flowering time April, seed ripens in December.

*Trunk* of considerable size, but generally crooked. *Bark* embossed with transverse protuberances on a smooth bright ash-coloured ground; inwardly very fibrous, but rather friable. *Wood* very firm and of a brownish gray colour. *Leaves* unequally pinnate, from six to ten inches long. *Leaflets* from five to twenty pairs; from opposite to alternate, those which first expand may be called the floral leaves, and have scarce-

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ly half the number of leaflets, which those have that unfold afterwards, oblong, or elliptic, obtuse, pretty smooth, from one to two inches long, and three-fourths of an inch broad. *Stipules* ensiform, clothed with ferruginous down. *Racemes* axillary, longer than the floral leaves. *Flowers* numerous, small, white, pretty long-pedicelled, from three to six, inserted on very short, alternate, common peduncles. *Bractes* small, ensiform, always two of them under the calyx. *Calyx* cup-shaped, villous, smooth, five-toothed. *Corol* as in the order. *Filaments* one and nine. *Germ* a short-pedicelled, semilunar body within the base of the nine conjoined filaments, linear, hairy, and containing from ten to fourteen ovula. *Style* ascending. *Stigma* smooth. *Legume* linear, from two to three inches long, and less than half an inch in breadth; *upper* margin sharp and distinctly defined by a strong rib, or nerve, to the inside of which the seeds are attached, thin and brittle, not opening. *Seeds* generally from four to eight, small, smooth, light brown, lenticular.

13. D. *marginata. Roxb.*

Scandent, scabrous. *Leaflets* five or seven, lanceolate, glossy, obtusely acuminate. *Panicle* axillary. *Stamina* one and nine. *Legumes* sub-linear, membrane-margined, one-seeded.

Mukree gilla, the vernacular name in Silhet, where it is indigenous; it blossoms in the rains, and the seed ripens during the hot season.

*Stem* woody, and with its numerous scabrous branches climbing and twining up and over trees, &c. *Leaves* alternate, unequally pinnate, from six to ten inches long. *Leaflets* two or three pair, and a terminal one, petiolate, lanceolate, entire, points long, narrow, and obtuse, of a firm texture and polished, from four to five inches long, and from one to two broad. *Panicles* axillary, length of the leaves, and its few remote branches spreading as much. *Flowers* remote, long, and slender-pedicelled, white. *Calyx* bowl-shaped, of a deep black

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purple; mouth obscurely five-toothed. *Banner* long-clawed, obcordate. *Wings* and *keel* long and slender-pedicelled, white. *Filaments* one and nine. *Germ* linear, smooth, three-seeded. *Stigma* rather larger, but smooth. *Legumes* obliquely-lanceolate, sessile, thin, smooth, hard and veined on the surface, without any kind of crack or fissure, one-celled, one-seeded, about four inches long, and one and a half broad. *Seed* solitary, reniform, thin, one inch long by three-fourths of an inch broad.

14. D. *rubiginosa. Willd.* iii. 902. *Roxb. Corom. pl.* ii. *No.* 115.

Climbing. *Leaflets* from five to seven, nearly opposite, lanceolate-oblong, smooth. *Spikes* axillary, sessile.

*Teling.* Tella-tiga.

A large, woody, climbing species, a native of the Circar mountains. Flowering in the hot season.

*Trunk* large, woody, running over the highest trees. *Bark* rust-coloured, pretty smooth. *Branches* alternate, bifarious, flexuose, short, rigid, erect. *Leaves* alternate, bifarious, pinnate, with an odd one, from four to six inches long. *Leaflets* generally three pairs, alternate, sessile, oblong, the exterior ones several times larger than the inferior ones, smooth on both sides, entire, firm, with many very fine, parellel veins, the exterior one about two and a half or three inches long, and three-fourths of an inch broad. *Petioles* round, downy. *Stipules* oval, small, covered with goose-dung green down. *Spikes* axillary, compound, small. *Peduncles* downy. *Flowers* as in the former species. *Filaments* ten, conjoined in one body, which is open on the upper side.

15. D. *volubilis. Roxb. Corom. pl.* ii. *No.* 191.

Twining. *Leaflets* five pairs, sub-alternate, oval, smooth. *Panicles* terminal. *Filaments* in two equal, five cleft bodies. *Legumes* linear-oblong.

*Teling.* Bandee-gurjun.

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A very large, woody, twining species, a native of the mountainous countries on the coast, where it runs up and over the highest trees.

*Branches*, their extremities often twine round whatever they meet with in the form of tendrils. *Leaves* alternate, bifarious, pinnate, with an odd one, four or five inches long. *Leaflets* about five pair, not opposite, nor alternate, but between the two; oval, small, pointed, entire, smooth, the exterior largest, about an inch long, by three quarters of an inch broad. *Stipules* scarcely any. *Panicles* terminal, large, bifarious; *ramifications* generally two-forked, and diverging. *Flowers* small, very numerous, blue. *Bractes* a small one below each, pedicelled, and two still smaller pressing on the calyx, oblong, nut-coloured. *Banner* orbicular, emarginate; *keel* below two-parted. *Filaments* two, placed laterally, each five-cleft, &c. as in the last. *Legume* pedicelled, linearly oblong, obtuse, membranaceous, waved, smooth, from two to three inches long, by one broad; not opening, from one to two-seeded.

16. D. *scandens. R. Corom. pl.* ii. *N.* 192.

Climbing. *Leaflets* opposite, oblong-lanceolate. *Racemes* axillary, as long as the leaves. *Legumes* linear-lanceolate, two or three-seeded.

*Beng.* Noa-lata.

Noël valli. *Rheed. Mal.* vi. *t.* 22. In *Willd. Sp. Pl. Vahl's Symbol.* and *Martin's Edition of Miller's Dictionary*, this figure is quoted for D. *lanceolaria*, which I think it cannot be for very obvious reasons.

*Cheratalee badoo* of the Telingas.

A common, very large, woody, climbing, or twining species. Flowers during the wet season.

*Branches* pendulous, remarkably long, and slender. *Leaves* alternate, pinnate, with an odd one, about six inches long. *Leaflets* from three to five pairs, opposite, oblong, or broad-lanceolate, obtuse, smooth, shining, entire; from two to three

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inches long and about one broad. *Petioles* channelled. *Racemes* axillary, single, long, bowing. *Flowers* fascicled, small, rose-coloured. *Filaments* one and nine, alternately shorter. *Legume* linear-lanceolate, membranaceous, &c. *Seeds* two, or three, kidney-form.

17. D. *tamarindifolia. R.*

*Leaflets* from twelve to sixteen pairs, linear-oblong. *Racemes* lateral, short, ovate, dense. *Filaments* nine in one body; *anthers* two-lobed. *Legumes* swelled, scabrous, where the single seed is lodged.

Ketee, the vernacular name in Silhet, where it is indigenous; growing to so great a size, as to run up and over trees. Flowering time March and April; seed ripe the January following.

18. D. *rimosa. R.*

Shrubby. *Leaflets* about seven, sub-alternate, oblong, finely parellel-veined. *Flowers* minute, panicled. *Filaments* ten, in one body. *Legumes* one, rarely two-seeded, rimose at the seeds.

Kaogroom, the vernacular name in Silhet, where it is indigenous in the forests; flowering in March and April, and the seed ripens in November and December.

19. D. *stipulacea. R.*

Shrubby. *Leaflets* from eight to twelve pair, alternate, linear-oblong. *Stipules* and *bractes* oblong-falcate. *Panicle* axillary, and terminal. *Filaments* ten, in two equal bodies.

An elegant bushy shrub, with small blue flowers, a native of Silhet, where it blossoms in April, and the seed ripens in November.

20. D. *spinosa. R.*

Shrubby, erect, lateral branchlets ending in a spine. *Leaflets* from six to ten, sub-alternate, cuneate-oblong. *Racemes*



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axillary, few-flowered. *Filaments* in two equal bodies. *Legume* oval, one-seeded.

A native of Chittagong.

*PTEROCARPUS. Schreb. gen. N.* 1159.

*Calyx* campanulate, five-toothed. *Legume** nearly round, leafy margined, varicose, one or more-celled; *cells* one-seeded.

1. P. *santalinus. Willd.* iii. 906.

*Leaves* ternate, with sub-rotund, retuse, smooth leaflets. *Racemes* axillary.

*Sans.* Chandana.

*Beng.* Chundana, or Rukta-chundun.

A native of Coromandel. Flowering time the hot season.

For a full description, see *Supplementum plantarum. Linn. p.* 318. *Willd.* iii. 906, &c.

2. P. *marsupium. Willd.* iii. 905. *R. Corom. pl.* ii. *No.* 116.

*Leaves* pinnate; *leaflets* from five to seven, alternate, elliptic, emarginate. *Panicles* terminal. *Stamens* ten in two bodies, coalesced near the base.

*Teling.* Yeanga-sha.

*Beng.* Peet-Sal.

This species, which grows to be a very large tree, seems not to have been taken notice of by any writer that I have met with. It is a native of the Circar mountains. Flowering time, the beginning of the rains, and the seed ripens about the close of the year.

*Trunk* erect, very high, though scarcely ever found straight. *Bark*, outer coat brown, spongy, falling off in flakes; inwardly red, fibrous, and astringent. *Branches* spreading, horizon-

* It rather deserves the name of a compressed, ligneous, varicose, one or more-celled, winged nut.

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tal, numerous, extending far. *Leaves* sub-bifarious, alternate, pinnate with an odd one, eight or nine inches long. *Leaflets* five, six or seven, alternate, elliptic, emarginate, firm, above shining, and deep green; below less so, from three to five inches long and two or three broad. *Petioles* round, smooth, waved from leaflet to leaflet, five or six inches long. *Stipules* none. *Panicles* terminal, very large, ramifications bifarious, like the leaves. *Peduncles* and *pedicels* round, a little downy. *Bractes*, a small caducous one below each division and sub-division of the panicle. *Flowers* papilionaceous, very numerous, white, with a small tinge of yellow. *Banner* with a long slender claw, very broad; *sides* reflexed, waved, curled, veined. *Wings* with claws as above, oval, waved, curled, veined. *Keel* two-petalled, adhering slightly for a little way near their middle, waved, &c. as the banner. *Filaments* ten, united into one body near the base, but soon splitting into two bodies of five each. *Anthers* globose, two-lobed. *Germ* oblong, pedicelled, hairy, generally two-celled; *cells* transverse, and to the anterior margin the single ovulum of each cell is attached. *Style* ascending. *Legume*, the under three-fourths orbicular, the upper side, which extends from the pedicel to the remains of the style, straight, the whole surrounded with a waved, veined, downy, membranaceous wing, swelled, rugose, and woody in the centre, where the seed is lodged, not opening; generally one, though sometimes two-celled. *Seed* solitary, kidney-shaped.

From wounds in the bark, there issues a red juice, which hardens in the open air into a dark red, very brittle, gummy resin, on being powdered it changes to a light brown, not unlike powdered peruvian bark. In the flame of a candle it burns with difficulty, and without cracking, swelling, noise, or any peculiar smell, into fine white ashes. In the mouth it melts away like the simple gums. Its taste is strongly, but simply astringent; as much so, I think, as that of the gum of the *Butea*, which it resembles much. It tinges the spittle but little; heat does not soften it.



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It is readily, and almost totally soluble in either water or spirit; the solutions are a pretty deep, but dull red, the spirituous one was rather more transparent, yet with a martial solution it shows considerably less astringency than the watery solution, here it differs from *Butea gum;* for the spirituous solution of that, although seemingly less perfect than this, shows rather more astringency with the chalybeate proof than the watery solution. The solutions bear being mixed without decomposition. Vinegar added to them makes no immediate change; mineral acids debase their colour; alkalies heighten them. In short, this substance is so exceedingly like the gum of the *Buteas*, that one analysis may serve for both. The solutions after being kept ten days showed no signs of change, and the same experiments were then repeated, with the same success.

*Note.* It is highly necessary to observe that the above analysis was made with the gum resin fresh from the tree, (how long it had adhered thereto I cannot say;) because I find, that when the gum of *Butea frondosa* is kept one year or two, it is less soluble in water than in spirit, and the watery solution grows sooner turbid; but at the same time this turbid solution continues as when recent, to show with a martial solution, more astringency than the spirituous.

The specimen of the *Gum-Kino* tree in the *Banksian herbarium*, is perfectly like this. It is probable these are the same, or very nearly allied.

3. P. *dalbergioides. R.*

*Leaves* pinnate; *leaflets* about nine, alternate, ovate-lanceolate, smooth. *Panicle* terminal. *Stamens* ten in two equal portions.

Andaman red wood.

A native of the Andaman Islands, from thence, in 1794, young trees were sent to the Botanic garden by Colonel Alexander Kyd. These are now, 1809, from forty to eighty

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feet high, blossoming during the rains in June and July chiefly, and ripening their seeds eight months after.

*Trunk* straight. *Bark* pretty smooth for so large a tree, ash-coloured. *Branches* numerous, spreading. *Branchlets* alternate, bifarious; *young shoots* somewhat scabrous, with small gray dots. *Leaves* bifarious, alternate, pinnate, spreading, from six to twelve inches long. *Leaflets* about four or five pair, with a single terminal one, alternate, short petiolet-ted; the *inferior* ones ovate-oblong; the *superior* ones longer, and narrower in proportion, all are entire, and smooth on both sides, from two to three inches long. *Petioles* round, smooth, about six inches long. *Stipules* none. *Panicles* terminal, ramifications alternate, bifarious, expanding with their extremities, while young of a beautiful dark greenish violet-colour. *Bractes* one-flowered, ovate, villous, small, caducous. *Flowers* papilionaceous, alternate, solitary, short-pedicelled, pure yellow, delightfully fragrant. *Calyx* somewhat gibbous; mouth of five, unequal divisions, the upper two being by far the largest. *Corol; vexillum* oval; *margins* reflexed back and beautifully curled. *Wings* projecting, long-clawed, pressing on the calyx, with margins curled, as in the vexillum. *Keel* of two small petals. *Filaments* two, most distinct, as in *Dalbergia*, hence the specific name; above the middle they divide into five, alternately with somewhat shorter filaments each. *Anthers* oval. *Germ* swelled, villous, dark greenish, violet. *Style* subulate. *Stigma* acute. *Legume* two-celled, pedicelled, sub-rotund, a small part of the upper margin only being more straight, the whole surrounded with a broad, membranaceous margin; the centre where one or two seeds are lodged, is of a firm, ligneous, fibrous, tough texture, not opening spontaneously. *Seeds* reniform, a single one in each cell.

On the Andaman Islands, where the tree is indigenous, it grows to an immense size. I have seen planks of it brought from thence, which were four feet in diameter, of coloured wood; and if six or eight inches be allowed for the white wood

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on the outside, which is not overrating it, the tree will have been above fifteen feet in circumference. The wood is not unlike Mahogany, but rather redder, heavier, and courser in the grain. That of the root is most beautifully variegated, I may say marbled, closer grained, and darker coloured.

4. P. *indicus. Willd. ed. sp.* iii. 904.

*Leaflets* from six to fifteen, alternate, ovate, firm and polished on both sides. *Stipules* ensiform. *Racemes* axillary. *Filaments* ten, in two equal portions. *Fruit* nearly orbicular, from one to three-seeded.

Lingoum saxatile. *Rumph. Amb.* ii. *t.* 70.

A tree of considerable size; a native of China, the Moluccas, and eastern parts of Asia. From the former it has been brought to Calcutta, and now, April 1808, a young tree is in flower in Sir John Royds' garden. Its trunk is straight, with smooth, olive-coloured bark, and few, long, waving branches, with their extremities generally drooping much. In its scanty ramification, it differs widely from my *Pterocarpus dalbergioides* which it most resembles in other respects. In that tree the branches are more numerous with many alternate bifarious, spreading, never drooping branchlets, forming a large spreading head.

*Leaves* alternate, pinnate, twelve or fifteen inches long. *Leaflets* from six to fifteen, alternate, petioletted, ovate, entire, with an emarginate point, firm and polished on both sides; from three to four inches long, and from two to two and a half broad. *Petioles* flexuous, slightly channelled, smooth. *Stipules* lanceolate, caducous. *Racemes* axillary, often compound, and a much larger panicle of simple racemes terminates the branchlets. *Flowers* numerous, deep orange yellow, and very fragrant. *Bractes* of the pedicel solitary, lanceolate; of the calyx two, and smaller, all caducous at a very early period. *Calyx* short, sub-cylindric, five-toothed; the upper two, larger. *Banner* with a long claw, nearly round, erect, and rugose. *Wings* also curled, and

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exactly of the same colour. *Keel* of two small, paler coloured, less curled petals. *Filaments* ten, united into two equal, distinct bodies of five each. *Anthers* small, two-lobed, deep yellow. *Germs* oblong, pedicelled, villous, generally three or four-celled, with one ovulum in each, attached to the middle of the anterior margin of its cell; *style* rather shorter than the stamina. *Stigma* acute. *Legume* nearly orbicular, wrinkled, of a very tough, ligneous texture, never opening spontaneously, broad-winged, three or four-celled; it frequently happens that two, or even three of the cells are abortive. *Seed* solitary, of a long, narrow, oblique kidney shape, smooth, lucid, and of a brown colour.

*GALEDUPA. Lamarck and Juss.*

*Calyx* cyathiform. *Stamina* one and nine. *Legume* elliptically-falcate, plain, one or two-seeded.

1. G. *indica. Lamarck. Encycl.* ii. 594.

Arboreous. *Leaflets* three-paired, ovate, pointed. *Racemes* axillary, with many flowers in pairs. *Legumes* elliptic, one-seeded.

Dalbergia *arborea. Willd.* iii. 901.

Pongam. *Rheed. Mal.* vi. *t.* 3.

*Sans.* Karunjuka.

*Hind.* and *Beng.* Kurunja, or Kenja.

Robinia *mitis. Linn. sp.* 1044.

Pungamia, Lamarck, and Pongamia *glabra*, of Ventenat seems to be this very tree.

Robinia *mitis, Loureir. Cochin Ch.* must, I think, be a different species; and I also suspect *Caju-galedupa, Rumph. Amb.* ii. 13. to be another, which I have not yet met with.

*Teling.* Ganuga.

A pretty large timber tree, from forty to fifty feet high, common over all the coast, Bengal, &c. *Leaves* deciduous at the end of the cold season, and in about a month are succeed-

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ed by the new foliage. Flowers during the hot season; and the seed ripens toward the close of the year.

*Trunk* rarely straight, height very various, say from ten to twenty feet. *Bark* smooth, olive-coloured. *Branches* spreading irregularly in every direction. *Branchlets* twiggy, very long, often pendulous. *Leaves* unequally pinnate, from twelve to eighteen inches long. *Leaflets* opposite, generally three pair, oval, pointed, entire, smooth, shining, deep green; about four or five inches long, and from two to three broad. *Petioles* round, smooth. *Stipules* oval, reflexed. *Racemes* axillary, peduncled, about half the length of the leaves, erect, many-flowered. *Bractes* broad-lanceolate, two-flowered, caducous. *Flowers* pretty large, of a beautiful mixture of blue, white, and purple. *Calyx* obliquely cup-shaped, slightly four-toothed, of a dark purple colour. *Banner* very broad, emarginate; *callous* processes large as in *Dolichos*, pointed, and projecting almost directly down. *Filaments* of equal length. *Stigma* smooth. *Legume* ovate, compressed, smooth, with the *apex* thick and bent down, about two inches long, and one broad, one-celled. *Seed* generally single, compressed, almost round, smooth, light gray.

The wood of this tree is light, white, and firm; it serves for a variety of economical purposes. Branches stuck in the ground to fence round some Cinnamon trees, grew readily; grass and almost every thing else grows well under its shade. The seeds yield an useful oil; and cattle are fond of the leaves.

2. G. *piscidia. R.*

Arboreous, smooth. *Leaflets* three or five, the pairs opposite, lanceolate. *Racemes* axillary and terminal, simple, or ramous. *Filaments* single and nine-cleft.

A small tree, a native of the mountains on the border of Silhet, where it is called *Chundkee* by the natives, who powder the bark and flowers, which they throw into any small body of water, where there are fish they wish to take, by

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which they are said to be intoxicated, and easily caught, and are not reckoned the less wholesome by the effects of the powder.

Flowering time July; seed ripens in the cool season.

*Twigs* slender, and clothed with remarkably white, smooth bark. *Leaves* alternate, quinate-pinnate, and ternate, from six to eight inches long. *Leaflets* three or five, the pairs opposite, or nearly so, petiolate, lanceolate, entire, obtusely acuminate, from two to four inches long, and one or one and a half broad. *Petioles* and *petiolets* round and smooth. *Stipules.* *Racemes* axillary and terminal, frequently ramous near the base, shorter than the leaves, smooth. *Flowers* pretty large, white, long-pedicelled, and always in pairs, rather remote from each other. *Calyx* campanulate; the *upper lip* of two rounded segments; the *under* one of three, and more protruded. *Corol* papilionaceous; the *wings* and *keel* remarkably slender. *Filaments* one and nine. *Germ* pedicelled, three or four-seeded. *Style* incurved. *Stigma* single. *Legume* long-pedicelled, differing in shape according to the number of seeds, the most common form is broad-spatulate, or battle-door-shaped with a sharp beak, and then one-seeded; *surface* pretty smooth, and reticulate with veins. *Seeds* as large as common garden beans, and much like them. *Embryo* as in the order. *Cotyledons* green.

3. G. *marginata. R.*

Twining. *Leaflets* petiolate, five, seven, or nine, oblong, and cuneate-oblong, entire, smooth. *Stipules* adnate, ovate, hairy. *Racemes* lateral. *Legume* sub-orbicular, smooth; *upper margin* winged, one, rarely two-seeded.

*Oo*knee, the vernacular name in Silhet, where it is indigenous; flowering in April and May.

*Stem* ligneous. *Branches* and *branchlets* twining and scandent to a great extent. *Bark* brown, and marked with little gray scabrous specks. *Leaves* alternate, from six to ten inches long, unequally pinnate. *Leaflets* five, seven or nine,



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distinctly petiolate, the pairs opposite, and oblong, the terminal one cuneate-oblong, all are entire, and smooth on both sides; from two to four inches long. *Petiolets* and *petioles* smooth. *Stipules* ovate, peltate, hairy. *Racemes* lateral, distinct, but numerous, and approximate, generally compound, scarcely villous. *Bractes* small, ovate, obtuse. *Flowers* numerous, pretty large, with a rosy keel, white banner and wings. *Calyx* wide, bowl-shaped, obscurely five-toothed. *Stamina* one and nine. *Germ* linear, very hairy, its base embraced by a small notched cup open on the upper edge, one-celled, containing two ovula, attached to the upper margin. *Stigma* acute, and simple. *Legumes* orbicular, marginated, finely acuminate, one, rarely two-seeded.

4. G. *elliptica. Roxb.*

Twining. *Leaflets* opposite, from four to five pair, cuneate-oblong. *Racemes* panicled, axillary. *Partial peduncles* from two to five-flowered. *Calyx* bowl-shaped, almost entire. *Banner* with two scales at the base. *Legume* elliptic.

A native of Amboyna and the Malay Islands. In the Botanic garden it blossoms in March, and ripens its seed in August.

*Stems* scandent and twining to a great extent. *Bark* dark brown, and scabrous. *Young parts* covered with ferruginous pubescence. *Leaves* alternate, unequally pinnate, from six to eighteen inches long. *Leaflets* opposite, from four to five-paired, short-petiolate, oblong, entire, smooth, taper, obtuse-pointed, from two to six inches long, the inferior ones being the smallest. *Petioles* channelled, villous. *Stipules* broad-triangular, obtuse, permanent, ferruginous. *Racemes* panicled, axillary, one, two, or three together, composed of alternate, short, diverging, partial, villous peduncles, bearing from two to five, large, pink-coloured, villous, pedicelled flowers on their apices. *Bractes* ovate, ferruginous. *Calyx* ample, of an oblique, gibbous cup shape, with its margin slightly five-toothed. *Banner* erect, oval, emarginate, with

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two remarkably large, callous, margined scales on the inside, near the base. *Stamens* one and nine. *Style* ending in a tapering, incurved, smooth, pointed stigma. *Legume* compressed, elliptic, rather acute, smooth, about two inches long, and one broad. *Seed* one, rarely two, reniform.

5. G. *uliginosa. Roxb.*

Twining. *Leaflets* three or five, ovate-oblong, smooth, pointed. *Racemes* axillary, compound. *Legume* sub-orbicular, compressed, one-seeded.

Dalbergia *heterophylla. Willd.* iii. 901.

Robinia *uliginosa* of the same volume, page 1133.

*Beng.* Pan-luta.

A native of the lower parts of Bengal, where it is found on the wet banks of rivers, nullas, &c. Flowering time the hot season.

*Stems* woody, twining. *Bark* scabrous, dark brown; *young parts* smooth. *Leaves* alternate, unequally pinnate. *Leaflets* two-pairs, besides the terminal one, opposite, short-petiolate, ovate, pointed, entire, smooth, and shining on both sides; the exterior one largest. *Racemes* compound, axillary, or from the old axills over the naked branchlets, erect, about as long as the leaves. *Bractes* minute. *Flowers* numerous, pretty large, of a beautiful rose-colour. *Calyx* campanulate, obscurely four or five-toothed. *Filaments* one and nine. *Legume* orbicular, with a small curved apex, compressed, smooth, rather more than an inch each way. *Seed* solitary, large, filling the whole legume.

## *BUTEA. Kön.*

*Calyx* campanulate, bilabiate. *Stamina* simple, and nine-cleft. *Legume* pedicelled, membranaceous, with one seed at the apex.



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1. B. *frondosa. Corom. pl.* i. *No.* 21. *Willd.* iii. *p.* 917.
Arboreous.
*Sans.* Pulasa.
*Beng.* Pulas.
Erythrina *monosperma. Lamarck. Encycl.* ii. *p.* 388.
*Teling.* Maduga.
Plasa. *Rheed. Mal.* vi. *t.* 16 and 17.

A middle-sized, or rather a large tree, not very common on the low land of the coast, but much more so among the mountains, and still more in Bengal. *Leaves* deciduous, during the cold season; they come out again, with the flowers, about the months of March and April; seed ripe in June and July.

*Trunk* generally crooked, covered with ash-coloured, spongy, thick, scabrous bark; the middle stratum of which contains a red juice, hereafter to be mentioned. *Branches* very irregularly bent in various directions. *Young shoots* downy. *Leaves* alternate, spreading, ternate, from eight to sixteen inches long. *Leaflets* emarginate, or rounded at the apex, leathery, above shining, and pretty smooth; below slightly hoary, entire, the pair are obliquely oval, from four to six inches long, and from three to four and a half broad, the exterior one obovate, and considerably larger than the lateral ones. *Common petioles* round, when young downy, as long as the leaflets. *Stipules* of the petioles small, recurved, downy, those of the leaflets subulate. *Racemes* terminal, axillary, and from tuberosities over the naked woody branchlets, rigid, covered with a soft, greenish-purple down. *Flowers* papilionaceous, pendulous, numerous, pedicelled, fascicled, very large, their ground colour a beautiful deep red, shaded with orange and silver-coloured down, which gives them a most elegant appearance. *Pedicels* round, about an inch long, articulated near the apex, and covered with the same greenish, velvet-like down. *Bractes* lanceolate, caducous, one below the insertion of each pedicel, and two smaller, pressing on the calyx. *Calyx* campanulate, leathery, two-lipped; the *upper lip* large, scarcely emarginate; the *under* one three-

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toothed, covered with the same dark green down that the racemes and pedicels are covered with. *Corol; banner* reflected, ovate, pointed, very little longer than the wings. *Wings* ascending, lanceolate, the length of the keel. *Keel* two-parted, ascending, large, semilunate, the length of the wings and banner. *Filaments* one and nine, ascending in a regular semi-circle, about as long as the corol. *Anthers* equal, linear, erect. *Germ* short, thick, pedicelled, lanceolate, downy. *Style* ascending, a little longer than the filaments. *Stigma* small, glandular. *Legume* pedicelled, pendulous, linear, thin, downy, about six inches long. *Seed* one, lodged near the point of the legume, oval, much compressed, smooth, brown, about an inch and a half long, and about one broad.

From natural fissures, and wounds made in the bark of this tree, during the hot season, there issues a most beautiful red juice, which soon hardens into a ruby-coloured, brittle, astringent gum; but it soon loses its beautiful colour, if exposed to the air. To preserve the colour, it must be gathered as soon as it becomes hard, and kept closely corked up in a bottle.

This gum held in the flame of a candle swells, and burns away slowly without smell or the least flame into a coal, and then into fine light white ashes. Held in the mouth it soon dissolves; its taste is strongly, but simply astringent. Heat does not soften it, but rather renders it more brittle. Pure water dissolves it perfectly; the solution is of a deep, clear red colour. It is in a great measure soluble in spirits, but this solution is paler, and a little turbid; the watery solution also becomes turbid when spirit is added, and the spirituous more clear by the addition of water; diluted vitriolic acid renders both solutions turbid, and caustic; vegetable alkali changes the colour of the watery solution to a clean, deep, fiery blood red.* The spirituous, it also deepens, but in a less degree.

* With an alkalized decoction of this gum, I tried to dye cotton cloth prepared with alum, with sugar of lead, and with a so-

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Sal martis changes the watery solution into a good durable ink.

These are, I think, proofs that a very small proportion of resin is present in this substance. In this it differs essentially from the gum-resin called *Kino* or *Gummi rubrum astringens Gambiense*, which the Edinburgh College has taken into their *Materia Medica*,* but as this can be most perfectly dissolved in watery menstruum it may prove of use, where a spirituous solution of the former, being the most complete, cannot be so properly administered; consequently it may prove a valuable acquisition also. I have used the recent gum in making my experiments, which may make some difference.

Infusions of the flowers, either fresh or dried, dyed cotton cloth, previously impregnated with a solution of alum, or alum and tartar, of a most beautiful bright yellow, which was more or less deep, according to the strength of the infusion. A little alkali added to the infusion, changes it to a deep reddish orange. It then dyed unprepared cotton cloth of the same colour, which the least acid changes to a yellow, or lemon. These beautiful colours I have not been able to render perfectly permanent.

Amongst numberless experiments, I expressed a quantity of the juice of the fresh flowers, which was diluted with alum water, and rendered perfectly clear by depuration. It was then evaporated by the heat of the sun, into a soft extract; this proves a brighter water colour than any gamboge I have met with. It is now one year since I first used it, and it remains bright.

Infusions of the dried flowers yielded me an extract very little, if any thing, inferior to this last mentioned. They yield

lution of tin in aqua-regia; but the reds produced thereby were bad; that where alum was employed, was the best.

* A specimen of the tree which produces this African substance in the *Banksian herbarium*, convinces me that it is a species of *Elæocarpus*.

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also a very five durable yellow lake, and all these in a very large proportion.

The *Lac* insects are frequently found on the small branches and the petioles of the leaves of this tree. Whether the natural juice of its bark contributes to improve the colour of their red nidus, or colouring matter, I cannot say. It would require a set of experiments accurately made on specimens of *lac* gathered from the various trees it is found on, at the same time, and as nearly as possible from the same place, to determine this point.

I do not find that the natives make any use of the gum, or flowers, although they promise to be valuable. The former as a medicine; and the latter as a pigment, and dying drug.

2. B. *superba. Willd.* iii. *p.* 917. *R. Corom. pl.* 1. *No.* 22.

Shrubby, twining.

*Teling.* Tiga-muduga.

This is a very large, twining shrub, a native of the Circar mountains. Flowering time the beginning of the hot season, and the seed ripens in June and July.

*Root* spindle-form, very large. *Stem* twining, as thick or thicker than a man's leg, woody, very long, running over large trees. *Bark* ash-coloured, pretty smooth. *Branches* like the stem, but with a smoother bark. *Leaves* alternate, terminal, remote, very large. *Leaflets* downy, in other respects as in B. *frondosa*, but much larger; the exterior one is often about twenty inches long, and broad in proportion, the lateral ones somewhat less. *Racemes* as in the former, but much larger. *Flowers* also the same, only much larger, and more numerous. *Calyx* divided as the other, but the divisions longer and much more pointed. *Corol* the same. *Legumes* and *seed* as in the former, but rather larger. When this species is in full flower, I do not think the vegetable world offers a more gaudy show. The flowers are incomparably beautiful, very large, and very numerous. The colours are so exceed-

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ingly vivid that my best painter has not been able, with his utmost skill, to imitate their brightness.

From fissures, &c. in the bark the same sort of ruby coloured astringent gum exudes as was noticed in the last species. The flowers also yield the same beautiful yellow dye and pigment.

3. B. *parviflora. Roxb.*

Shrubby, twining. *Panicles* axillary, and terminal; *flowers* small, and white. *Banner* emarginate.

A native of the mountainous parts of the Rajamundree Circar, from thence Captain Alexander Denton sent the seeds to the Botanic garden in 1797, where, when about ten years old, they began to blossom in December, and the seed ripened in April and May.

When in flower, it is immediately known by its copious panicles of small, white flowers. In other respects it is so much like *Butea superba*, that I took it for that species until it blossomed.

*Stem* in plants twelve years old, as thick as a man's leg, ligneous, twining. *Bark* light brown, and somewhat spongy. *Branches* numerous, twining over trees, &c. to an extent of many fathoms.

*Leaves* alternate, ternate, about a foot long. *Leaflets* the pair obliquely oblong, the terminal one nearly round-obovate; all are entire, obtuse, or emarginate, both sides somewhat villous, particularly underneath; of a pale dull green, about six inches long, and nearly as broad. *Petioles* round, slightly channelled, when young, villous, from three to six inches long. *Stipules* of the petioles triangular, acute. *Panicles* terminal, with the smaller or single branches thereof in the axills of the exterior leaves, branches alternate, bifarious, diverging. *Flowers* numerous, short-pedicelled, small, white, in proximate fascicles of three. *Bractes* numerous, ovate-oblong, small, downy, a common one under each fascicle, one on the base of each pedicel, and two pressing each calyx la-

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terally. *Calyx* bilabiate, the downy upper lip bidentate; the under one three-cleft. *Corol* papilionaceous. *Stamina* one and nine. *Anthers* round. *Germ* sessile, two-seeded. *Stigma* large, smooth, pellucid. *Legume* pedicelled, linear, thin, clothed with a soft, brown, velvet-like down, apex one-seeded. *Seed* round-reniform, compressed, its greatest diameter nearly an inch. *Integument* single, smooth, brown. *Perisperm* none. *Embryo* as in the other *Leguminosæ.*

*ERYTHRINA. Schreb. gen. N.* 1163.

*Calyx* bilabiate. *Corol* with the standard much larger than the small wings and keel. *Legume* pedicelled, torose.

1. E. *indica. Willd.* iii. 913.

Arboreous, armed with black prickles. *Leaves* ternate, unarmed. *Racemes* terminal, horizontal. *Keel* two-petalled, equalling the wings.

Mouricou. *Rheed. Mal.* vi. *t.* 7.

*Sans.* Mundar.

*Beng.* Palita-mandar.

*Teling.* Badsta-chittoo.

Dudap, or Dudap of the Malays; and when employed to support the black pepper vine, for which it is very generally used, they call it *chinkereen.*

A pretty large tree, and common over India and the Islands. Flowering time the beginning of the hot season, in March and April. Seed ripens in June and July.

*Trunk* pretty straight, short but thick; *branches* many, forming a large, shady head. *Bark* of the trunk and large branches smooth, of a greenish ash-colour, in the younger branches, armed with small, black, sharp prickles, which generally fall off about the third or fourth year, leaving the trunk and large branches unarmed. *Leaves* ternate. *Leaflets* smooth, and entire, the terminal one broad-cordate; the



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pair obliquely so, from three to six inches long, and about the same breadth. They are deciduous in the cool season, which corresponds with winter in Europe. *Petioles* round, smooth, unarmed. *Stipules* of the *petioles* falcate, those of the leaflets round, and concave underneath. *Racemes* terminal, and projecting horizontally at a right angle from the branchlet, sub-secund. *Pedunctes* round, while young and tender somewhat mealy; when advanced, smooth, ferruginous purple; *pedicels* ascending in a curved direction, tern, but often so crowded as to appear verticelled. *Bracteas* minute, one under each pedicel, and two on the calyx. *Flowers* numerous, large, of a bright dazzling scarlet. *Calyx* spathaceous, opening longitudinally on the upper side; apex contracted, five-toothed. *Banner* oblong, erect. *Wings* scarcely one-fourth the length of the banner, semilunar. *Keel* two-petalled, and much like the wings. *Filaments* one and nine. *Anthers* sagittate. *Germ* long-pedicelled, mealy, from ten to fifteen-seeded. *Style* so long as to elevate the erect glutinous stigma a little above the anthers. *Legume* from six to twelve inches long, cuspidate, very protuberant at the seeds, and equally so on each margin, when ripe blackish, and wrinkled. *Seeds* from six to eight, oblong, smooth, blackish-purple.

This tree is employed, in many parts of India, to support the black pepper vine. See Marsden's *History of Sumatra, page* 107. The best method for raising them is by planting cuttings of about eighteen inches, or two feet long, and about as thick as a man's arm, half under ground, if planted of a greater length, the wind is apt to shake them, which prevents their striking root. From ten or more feet asunder, according to the quality of the soil, and in quincunx order, is from my experience, the best way.

What seems to render these trees very proper for this purpose, is their quick growth, their firm, permanent, though smooth bark, which never peels off, and gives firm hold to the roots of the vine, which come out abundantly at the joints. And lastly, they are full of leaves, and very shady during

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the hottest months of the year, which shelters the vines from the intense heat of the sun, and keeps the ground moist. As soon as the hottest weather is over, the leaves drop and expose the vines to the sun and weather during the cool season, which I conceive renders them more healthy, and of course more productive. They must be kept in a dwarf state, by topping, and cutting off the lateral branches, for if allowed to grow without interruption, they would soon arrive at very great height, which would be very unfavourable for collecting the pepper.

The immense quantity of large leaves that fall annually from these trees, manures the ground below them, which becomes more and more fertile, the longer it remains in this state; so that when the vines have done bearing, the land must be in a much better condition than when first planted. Daily experience proves the truth of this.

2. E. *stricta.*

Arboreous, armed with innumerable white prickles. *Leaves* unarmed. *Racemes* terminal, horizontal. *Calyx* minute, spathaceous, entire. *Wings* sub-triangular, minute. *Legumes* lanceolar, from two to three-seeded.

En-mouricou, the vernacular name at Anjenga, and Penmouricou that of E. *indica*, which this resembles much.

A native of Malabar; from Anjenga the seeds were received into the Botanic garden, under the Canara name *En-mouricou*, at the same time, seeds of E. *indica* were received under the name *Pen-mouricou*. Both grew rapidly, for in two years the latter flowered in April, and in three, the former began to blossom early in March, and ripened its seed by the middle of April.

*Trunk* perfectly straight, in our young trees eighteen inches in circumference, four feet from the ground; *branches* few, and covered with smooth olive-coloured bark, all are well armed with numerous, short, sharp, light green prickles, height about twenty feet. On the Malabar coast it grows to



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be a tree of very considerable magnitude. *Leaves* ternate. *Leaflets* the pair unequally broad-cordate; the terminal one reniform-cordate, all are smooth, entire, and pointed, from three to five inches each way. *Petioles* round, smooth, very rarely prickly, about six inches long. *Stipules* narrow-falcate, more permanent than the leaves. *Racemes* terminal, projecting horizontally at right angles from the apex of the new leafless branchlets. *Bractes* minute, caducous; one under each pedicel, and two near their apices. *Flowers* tern, numerous and crowded, large, as in E. *indica*, and the colour the same bright dazzling scarlet. *Calyx* minute, not above one-tenth part of the length of the banner, spathiform, entire, acute, opening on the upper side, withering. *Banner* oblong, erect. *Wings* minute, even shorter than the calyx, semi-obovate. *Keel* half the length of the banner, and four or five times longer than the wings, two-petalled, but firmly united, and in that state, when expanded ovate; *colour* pale greenish yellow, which is also the colour of the wings; with the addition of a slight tinge of pink. *Filaments* seem one and nine, but the ten are united into one, a little above the base, alternately short. *Germ* pedicelled, villous, containing from four to six ovula attached to the upper margins. *Style* tapering. *Stigma* acute. *Legume* pedicelled, lanceolar, subulate, pointed, from three to five inches long, smooth, light brown. *Seeds* one, two or three, rarely more come to maturity, lodged equally distinct from the ends, oval, smooth, light brown, of the size of a French bean.

*Note.* Notwithstanding the great similarity of this tree, to E. *indica*, *Mouricou* of Van Rheede, there can be no doubt of its being specifically distinct; the small, entire, spathiform, calyx and minute triangular wings, are sufficient marks by which to distinguish it from all our other Indian *Erythrinas*, exclusive of the colour of the prickles, which is, no doubt, the most obvious criterion. The contents of the germ furnish another proof; in that containing from ten to fifteen ovula, in this only from four to eight, generally about six.

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3. E. *suberosa. Roxb.*

Arboreous, with corky, deeply cracked bark. *Leaves* white, with down, ternate, prickles three-fold, and stipulary. *Petioles* armed. *Racemes* axillary, spreading. *Wings* most minute. *Keel* one-petalled.

*Teling.* Moonee, Maduga.

This species I have found in the Circar only; there it is much less common than the E. *indica*, but grows in every soil, and situation. *Leaves* deciduous during the cold season. Flowers in February and March, soon after the leaves appear.

In the Ganjam district, a variety is found, with the exterior leaflets reniform, and the apex perfectly rounded.

*Trunk* erect, generally from eight to twelve feet to the branches, covered with light gray, corky, deeply cracked bark; *branches* numerous, very crooked, spreading in every direction. *Prickles* stipulary, three-fold at the insertion of the leaves, and no where else, recurved, sharp, falling off about the third or fourth year. *Leaves* alternate, ternate. *Leaflets* the pair obliquely broad-cordate, the exterior one rhombiform, entire, above hairy; below covered with much soft, white down, three or four inches each way. *Petioles* pretty long, round, downy, armed with a few small prickles. *Glands* a pair at the insertion of the lateral leaflets, and another pair where the common petiole ends in the exterior leaflets. *Stipules* lanceolate. *Racemes* axillary, sometimes terminal, horizontal, &c. as in *indica*, but much smaller. *Flowers* as in *indica* but smaller. *Calyx* tubular, with a two-lipped mouth. *Corol; banner* as in *indica*. *Wings* minute, colourless, hid within the calyx. *Keel* one-petalled, cordate, many times longer than the wings. *Filaments* ten, all connected, alternately shorter. *Legume* pedicelled, containing generally two, though sometimes three remote seeds, the interstices filled with a gray, light spongy substance.

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4. E. *ovalifolia. Roxb.*

Arboreous, armed. *Leaves* ternate; *leaflets* oval. *Petioles* armed. *Racemes* terminal, horizontal. *Banner* obcordate.

*Beng.* Hari-kekra.

Is rather a scarce tree about Calcutta, which is the only place in which I have yet seen it. Flowering time the end of the cold season; the seed ripens before the rains begin.

*Trunk* straight. *Bark* very thick, and deeply cracked. *Branches* numerous, armed with innumerable, small, sharp, black pointed prickles. *Leaves* scattered, petioled, ternate. *Leaflets* oval, entire; *upper side* very pale green, and covered with a few, slender depressed hairs; *under side* very hoary, without any distinct kind of pubescence; from four to six inches long, and from two to three broad. *Petioles* smooth, except for now and then a few prickles; two umbilicate glands at the insertion of the pair of leaflets, and two similar ones at its apex. *Stipules* small, hard. *Racemes* simple, terminal, horizontal, from one to six. *Flowers* numerous, dark red, collected in threes round the raceme, on downy, erect pedicels. *Bractes* of the pedicels four-fold; viz. one below the insertion of each lateral pedicel, and two to the central one; small, downy; those of the calyx two, small, opposite. *Calyx* bursting open irregularly, on the outside downy, no meliferous gland could be seen. *Banner*, twice the length of the keel, erect, broad-obcordate, emarginate; *claw* long and tapering. *Wings* a third shorter than the keel, with the extremities coloured. *Stamens* ascending, one and nine, with as many corresponding glands on their inside round the base of the pedicel of the germ. *Anthers* incumbent, on alternately longer filaments. *Germ* pedicelled, downy. *Style* awled. *Stigma* small. *Legume* as in the genus.

5. E. *sublobata. Roxb.*

Arboreous, armed. *Leaves* ternate; *leaflets* sub-triangu-

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lar, repand, downy underneath. *Petioles* unarmed. *Racemes* terminal.

*Teling.* Badadum.

An immensely large tree, a native of the inland mountains in the Circars. *Leaves* deciduous. Flowering time, &c. as in the former.

*Trunk* erect, frequently of very great size. *Branches* spreading, very numerous, the larger as well as the trunk without prickles and covered with thick bark, the inner stratum of which is fibrous, the middle yellow, and farinaceous, the exterior a smooth, hard, yellow, firm crust, of vegetable gluten. *Prickles* strong, conical, very sharp, exceedingly numerous on the younger branches, covering them almost entirely; three of them, and generally they are the largest, stand round the marks left by the insertions of the leaves; these were the only stipules. *Leaves* alternate, ternate, from twelve to eighteen inches long. *Leaflets* the pair obliquely cordate; the odd one rhombic, all variously lobate-sinuate, or notched; above smooth, covered with soft, white down underneath, from five to six inches each way; while young covered with much rust-coloured down. *Petioles* long, round, downy, without prickles. *Glands* as in E. *suberosa*. *Stipules* three-fold, strong, conical, sharp, permanent, becoming prickles. *Racemes* terminal, erect, slender, a little downy. *Flowers* three-fold, spreading, otherwise in every respect very much like those of E. *suberosa*.

The wood of all these species is remarkably light, soft, and spongy. It is generally employed, but chiefly that of E. *indica*, being the most common, by the people who make trunks, paint, varnish, &c. to make trunks, toys, and other things that are to be varnished; its numerous, large pores admit, and retain their priming, or under coating better than almost any other wood; besides it is not liable to warp, contract, or split, and is, as before observed, exceedingly light. At the village of Kundupilla, near Masulipatam, they are particularly clever at varnishing upon these sorts of wood.

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6. E. *arborescens. Roxb.*

Sub-arboreous. *Trunk* and *longer branches* prickly. *Leaves* terminal, unarmed; *leaflets* reniform-deltoid, entire. *Racemes* straight. *Bractes* three-flowered. *Calyces* truncate, entire. *Legume* pedicelled, five-pointed, villous, from six to eight-seeded.

From Nepal, Dr. Buchanan sent the seeds to the Botanic garden where in one year the plants blossomed for the first time in October. In Nepal Dr. B. observed it to be a small branchy tree ten or twelve feet high; here in seven years they are only five or six feet high, and with but very few branches.

*Trunk* straight, with not more than two or three, simple, ascending branches, armed with a few, scattered small, sharp prickles, otherwise smooth in every part. *Leaves* ternate. *Leaflets* entire, smooth above, whitish underneath, the exterior one nearly reniform, the pair obliquely broad-cordate. *Petioles* longer than the leaflets, round, smooth, perfectly destitute of prickles, a pair of glands at the insertion of the pair of leaflets, and another pair at the apex of the long portion which supports the terminal one. *Stipules* oval, small. *Racemes* from the terminal axills, solitary, perfectly straight, longer than the leaves. *Bractes* solitary, three-flowered, ovate, within this common bracte, there is a minute proper one at the base of each pedicel. *Flowers* numerous, large, of a vivid scarlet, three-fold, pedicelled, drooping over each other in an elegant imbricated form. *Calyx* entire, but campanulate, smooth, coloured. *Corol; banner* sub-ovate, boat-shaped, incumbent over the rest of the flower. *Wings* shorter than the keel, obliquely-obovate, greenish. *Keel* also greenish, two-parted at the base, and apex, scarcely half the length of the stamens. *Filaments* rather shorter than the banner, united into one body near the base, alternately longer. *Germ* long-pedicelled. *Style* the length of the stamens. *Stigma* acute, ascending. *Legumes* pendulous, pedicelled, villous, cuspidate, torose at the seeds. *Seeds* from five to ten.

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1. E. *resupinata. Roxb.*

Herbaceous. *Leaves* ternate, appearing after the flowers decay. *Racemes* radical, leafless; *corol* resupinate. *Filaments* one and nine.

A native of Hindoostan. In the Botanic garden they blossom in March, at which time no part of the plant is visible but the raceme.

*Root* perennial. *Stem* nothing more than a single, from four to five inches high, scarce prickly, slightly villous shoot, which with the leaves, decays about the close of the rains. *Leaves* ternate, rather long-petioled. *Leaflets* nearly round, entire, smooth, from two to three inches each way. *Petioles* and *nerves* of the leaflets somewhat prickly. *Stipules* ovate. *Racemes* radical, short-peduncled, appearing long before the harbaceous stem, roundish-ovate, not six inches in height, but uncommonly interesting and beautiful. *Flowers* numerous, three-fold, pretty large, bright scarlet. *Calyx* bilabiate. *Corol* resupinate. *Banner* oval-shaped, much longer and larger than the keel, bright scarlet. *Wings* obovate, minute, and nearly colourless. *Keel* much longer than the wings, tinged with red. *Filaments* one and nine, alternately shorter than the banner, but double the length of the keel.

*ABRUS. Schreb. gen. N.* 1162.

*Calyx* obscurely four-lobed; the *upper lobe* broadest. *Filaments* nine, united into a sheath at bottom, gaping at the back. *Stigma* blunt. *Seeds* sub-globose.

A. *precatorius. Willd.*

*Sans.* Gunja, Krishnala, its red seed Ruttika.

*Hind.* Rutti.

*Beng.* Koonch or Goontch.

Konni. *Rheed. Mal.* viii. *t.* 39.

Abrus. *Rumph. Amb.* v. *t.* 32.

Phaseolus arborescens, &c. *Pluck. Alm.* 294. *t.* 214. *f.* 5.



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Gunja. *Asiat. Res.* ii. 154, and 499.

This is one of the most common plants in every part of India. Flowering time the close of the rains.

*Root* ramous. *Stem* ligneous, twining; *bark* smooth; *young shoots* with a few, white, depressed hairs. *Leaves* alternate, abruptly pinnate, from two to six inches long. *Leaflets* opposite, sub-sessile, from eight to fifteen pair, linear-oblong, smooth, entire, both ends obtuse, the lower pairs smaller. *Petioles*, the common channelled on the upper side, and a little hairy. *Stipules* of the leaves lanceolate, of the leaflets minute. *Racemes* axillary, solitary, long-peduncled. The peduncle itself horizontal, thick, and strong, often leaf bearing. The raceme, or flower-bearing part, erect, secund, with the apex projecting in a curve. *Flowers* numerous, short-pedicelled, inserted on two rows of large, alternate, round, glandular tuberosities, growing on the exterior side of the raceme, pretty large, and of a pale pink colour. *Calyx* campanulate, mouth obscurely five-toothed. *Corol; banner* ovate, sides deflected, apex ascending, the length of the wings. *Wings* falcate, projecting horizontally. *Keel* cymbiform, the length of the other petals. *Filaments* nine, conjoined into a cylinder, with a fissure on the upper side, the distinct portions erect, and alternately shorter. *Anthers* ovate, small. *Pistil* minute, hid in the base of the tube of the stamens. *Germ* hairy. *Style* very short. *Stigma* headed. *Legume* of a long-rhomboidal shape, protuberant at the seeds, divided by transverse membranes, into as many cells as there are seeds. *Seeds* generally four or five, spherical, smooth, of a bright, shining red, or white, with a black mark at the eye, or more rarely black with a white eye.

The seeds are often used as weights by jewellers.

The root is employed as a substitute for liquorice, (*Glycyrrhiza glabra,*) being like it, sweet and mucilaginous.

Of this pretty plant, I have met with three varietes in India, viz.

1*st.* With rose-coloured flowers, red seed, and black eye.

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2*nd.* With dark-coloured flowers, black seed, and white eye.

3*rd.* With white flowers, white seed, and black eye.

*CROTALARIA. Schreb. gen. N.* 1172.

*Calyx* five-parted. *Keel* beaked. *Filaments* connate, with a fissure on the back, which has a circular gape at the base. *Anthers* alternately sagittate, and sub-rotund. *Legume* turgid.

SECT. I. *Leaves simple.*

1. C. *juncea. Willd.* iii. *p.* 974. *Corom. pl.* 2. *N.* 193.

Annual, straight. *Leaves* sub-sessile, linear-lanceolate, hairy, rather obtuse. *Racemes* terminal. *Legumes* sessile, club-shaped, many-seeded.

*Sans.* Sana. See *Asiat. Res.* iv. *p.* 296.

*Beng.* Sun.

*Teling.* Chanamoo.

*Cing.* Henna, or Hane.

Katou-tandale-cotti. *Rheed. Mal.* ix. *t.* 26.

See *Philosophical Transactions of London, vol.* lxiv. *p.* 99.

An annual plant, very generally cultivated all over the southern parts of Asia for the fibres of its bark, which may be called the Hemp of India. The time of flowering and ripening its seed depend on the season it is sown; for in some parts it is raised during the rainy season, in others during the dry.

*Stem* annual, straight, from four to eight feet high, or even more, striated from the insertion of the leaves, a little downy, towards the top branchy, and, when the plant stands single, more so. *Leaves* scattered, short-petioled, lanceolate, obtuse, with a small bristle-like point; both sides covered with soft, silver-coloured hairs, from two to six inches long, and from half an inch, to one and a half broad. *Stipules* subulate,



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small. *Racemes* terminal, single. *Bractes* oval, one-flowered. *Flowers* numerous, papilionaceous, large, of a beautiful bright yellow. *Calyx* bilabiate; the *upper lip* two-cleft; the *under* one three-parted in the middle, and there gaping; at the apex the segments are united. *Banner* obtuse, erect. *Wings* oblong, obtuse. *Keel* much pointed, slightly twisted at the apex and closely shut. *Filaments*, their lower half united into one body, with a fissure down the upper side, which has a circular gape at the base; extremities free, and alternately shorter. *Anthers* on the shorter filaments linear, on the longer ovate, and two-lobed.* *Legumes* sessile, club-shaped, downy, from one to two inches long. *Seeds* numerous, kidney-formed.

This plant yields the natives their best hemp, for they have no idea of the quality of the bark of the common hemp plant, *Cannabis*, which is indigenous in every part of India; the leaves and flowers thereof being the only parts used by them. These they employ as an intoxicating, narcotic drug, and a most powerful one it is.

There is something very interesting in those two sorts of stamens. If a flower is opened sometime before the natural time of its expanding, which must be just before any of the anthers burst, the filaments of the subulate set will then be found considerably longer than those of the round set, and the stigma will then be about the same height; these long anthers come to maturity long before the round ones, and about the time the stigma is among them; but the style continues to grow longer, by which means the bearded stigma pushes on with it much of the pollen from the long anthers whose filaments do not now lengthen any more; but those of the round ones now begin to lengthen, pushing their anthers considerably beyond the apices of the linear set, and even with the stigma, by this economy they come in contact with it before or about the time of their maturity. These changes I have found most conspicuous in *Crotalaria juncea* and *pentaphylla*, whose flowers are very large, every part being easily seen with the naked eye.

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This very useful species of *Crotalaria* is extensively cultivated by the natives in most parts of India. In the Northern Circars the seed is sown towards the close of the rains, in October or November; a strong clayey soil suits it best, the farmers say; about 120 lbs. of seed to the acre, is the usual allowance. It requires no further care than being covered with the soil, which is done with the common Hindoo *harrow*, viz. a bush or two, which two bullocks, or buffaloes drag over the field. In February or March, soon after the flowers drop, and before the seed is ripe, it is pulled up by the roots, like hemp in Europe; half dried in the sun; then tied up in bundles, and committed to the water, where it is steeped, &c. The rest of the process being exactly similar to that of common hemp. Those plants that are left standing for seed, yield bark of an inferior, though stronger quality, so that the time of pulling must be attended to. Of this the natives make their cordage, twine, fishing nets, gunny, viz. a strong coarse kind of sack-cloth, &c.

This plant, and it is the only one, is also cultivated by the natives of some parts of the Northern Circars to feed their milch-cows with, during the dry season. I have found that it is very nourishing, and causes them to give more milk than most other food: it only bears two or three cuttings, after that the plants perish.

The following is an account of the cultivation of the *Sun* plant (*Crotalaria juncea* of Linnæus) and preparation of the fibres of its bark, called *Sun* by the people of Bengal.

It is a tall annual, and very generally cultivated all over the southern parts of Asia for the fibres of its bark, which may be called the *hemp* of those countries where it is cultivated. A very full and particular account of the various methods of cultivation, &c. will be found in Wissett's Book on the *Cultivation and Preparation of Hemp and Sun*, published in London in 1804; and some remarks by myself in the 22nd and 24th volumes of the *Transactions of the Society for the Encouragement of Arts, &c.* I will however give a brief state-

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ment of the usual modes in Bengal, and add such remarks as I think may be of use to improve the quality of the fibre, which is naturally excellent, probably not inferior to the hemp of Europe.

When cultivated during the rains, which is very generally the case in Bengal, an elevated, rich, friable soil is required, which ought to be well ploughed, or otherwise dressed to free it of weeds, and bring it into good tilth. The seed, about from eighty to one hundred pounds weight to the acre, is sown when the first showers fall, about the beginning of the periodical rains in May or June, and covered in by the harrow, or any other mode. Little more is required, as the plant grows so rapidly, as to keep down the weeds itself. By August the plant will be in flower, and from five to eight, or more feet high. When the fibre is required of a fine quality, it is pulled in this stage of its growth; if strength is the object, it must stand till in seed, or even till the seed is ripe. When thought fit for the purposes intended, it is cut, or pulled up by the root.

Some recommend steeping it immediately when it is pulled, in standing fresh water, as with hemp in Europe; others, and I believe with good reason, recommend its being dried for some time previous to being steeped, upon this head much will be found in Mr. Wissett's Book.

The length of time required for steeping depends on the season of the year, the heat of the weather, and water. In August and September, from two to three days is generally sufficient. When that is accomplished, which will be known by the bark separating freely from the stalk, but not too much so as over-steeping weakens the fibre much, the people employed in the work stand in the water, in which the plant has been steeped; each takes a handful thereof which he breaks in one, or more places, after having washed off any mud, or filth; then grasps it by one end between both hands, and beats it against the surface of the water, which quickly

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removes the reed from the fibres; when the parcel is turned, and the other end treated in the same manner.

This simple mode is very generally followed by the natives of Bengal, and not only removes the reed quickly, but washes the fibres at the same time; hence the *sun* of Bengal is always whiter than that of Bombay or Salsette, though they are the produce of the same plant; and it is probably the most expeditious mode that can be devised; but unfortunately the fibres are always so materially entangled, that they give but little support to each other, until by the heckle, they are in some measure restored to their natural situation, with the loss of nearly one half of the original quantity, which renders the heckled *sun* of Bengal high priced.

About Bombay, the Salsette *sun*, or *hemp*, as it is generally called, is reckoned particularly good, not inferior to the best Russian hemp, and that is all peeled by the hand. Numerous experiments made by me, induce a belief that its superiority depends on the peeling.

In that country, and in many other parts of India, the seed is sown toward the close of the rains, when a stronger soil is said to be required. In other respects the management is the same.

2. C. *tenuifolia. R.*

Perennial, ramous, straight-furrowed, hoary. *Leaves* linear, sericeous underneath. *Stipules* minute, subulate. *Racemes* terminal. *Legumes* sessile, clavate, many-seeded.

A native of Coromandel. In the Botanic garden it is perennial, growing to the height of nine feet, with numerous, slender, furrowed, straight branches, which are again more ramous at top; during the cool season each twig ends in a long raceme of large yellow flowers; and the seed ripens in two months.

3. C. *tetragona. Roxb.*

Shrubby, erect; *young shoots* four-cornered, villous.

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*Leaves* linear, lanceolate, acute. *Stipules* minute, filiform. *Racemes* terminal, drooping. *Legume* sessile, clavate, hairy.

From Nepal Dr. Buchanan sent the seed to this garden in 1802, where the plants grow well, and generally blossom during the hot season; and ripen their seed two months after.

*Stem* erect, shrubby, with many expanding, drooping, alternate branches; *young shoots* villous, and four-cornered, whole height of the plants four or five feet, and lasting from two to four years. *Leaves* alternate, sub-sessile, linear-lanceolate, acute, slightly villous, entire, from two to six inches long, and less than an inch broad. *Stipules* filiform, minute, villous. *Racemes* terminal, solitary, drooping, few-flowered. *Flowers* remote, drooping, large, yellow. *Bractes* of the pedicel ovate, acute, solitary, one-flowered, those of the calyx, on the opposite sides of its base, and smaller than those of the pedicel. *Calyx* bilabiate; the *upper lip* bipartile, the *under* one three-cleft, but the margins of the segments are united, requiring force to separate them, otherwise it remains entire. *Legume* sessile, clavate, hairy, many-seeded.

4. C. *stipulacea. Roxb.*

Shrubby, erect, ramous, hairy. *Leaves* sessile, lanceolar. hairy. *Stipules* lanceolar, and conspicuously large. *Racemes* terminal. *Bractes* of both pedicel and calyx lanceolar. *Legumes* sub-sessile, oblong.

A native of Mysore, from thence the seeds were sent by Mr. Heyne to the Botanic garden at Calcutta, where the plants thrive well, blossom and ripen their seed during the cold season.

*Stem* erect, ligneous. *Branches* erect; *young parts* very hairy; height of the whole plant three or four feet. *Leaves* simple, scattered, sessile, lanceolate, entire, very hairy; from one to two inches long, and from a quarter to half an inch broad. *Stipules* lanceolate, almost half as long as the leaves, and equally hairy. *Flowers* solitary, scattered, pretty large, yellow. *Bractes* lanceolate, hairy, one-flowered, three-fold

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under the insertion of the pedicels of the lower flowers of the raceme; under those of the upper part solitary; besides these there are two at the apex of each pedicel, close to the calyx; all are permanent. *Legume* sub-sessile, smooth, thickest near the apex, more than twice the length of the permanent calyx. *Seeds* numerous, small, deep shining black.

5. C. *stricta. Roxb.*

Annual, straight, hairy. *Leaves* lanceolate. *Flowers* solitary, axillary and on terminal racemes. *Calyces* hairy, larger than the corols. *Legumes* sessile, clavate, smooth, many-seeded, shorter than the permanent calyx.

*Teling.* Moonga.

This species I have only found in the valleys up amongst the Circar mountains, and in my own garden, where I raised it from seeds brought from those valleys.

*Root* annual. *Stem* straight, from one to three feet high, striated, hairy, with few or no branches. *Leaves* scattered, very short-petioled, expanding, lanceolate, hairy underneath, entire, from three to four inches long, and less than one broad. *Stipules* minute, setaceous. *Flowers* opening in the evening, situation various, they are in general solitary, a little above the axills, and on short, terminal racemes, pretty large, of a sulphur colour. *Bractes* lanceolate, one below each peduncle, and two to the calyx. *Calyx* remarkably large, particularly the two upper divisions, very hairy. *Legume* sessile, clubbed, smooth, a little shorter than the calyx, from thirty to forty-seeded.

6. C. *montana. Roxb.*

Shrubby, erect. *Leaves* cuneate, lanceolate, obtuse, smooth. *Stipules* and *bractes* minute. *Racemes* terminal. *Legume* sessile, smooth, few-seeded.

*Teling.* Kunda-galli-geetsa.

This species I have never found, but upon the Circar mountains; it is a pretty large twiggy shrub.



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*Branches* slender, erect, a little hairy when young. *Leaves* scattered, short-petioled, linear-lanceolate, obtuse, with a bristle, entire, both sides covered with a few silver-coloured hairs, about two inches long, and little more than half an inch broad. *Stipules* most minute, subulate. *Racemes* terminal, long, many-flowered. *Bractes* very minute, subulate. *Flowers* middle-sized, yellow. *Legumes* sessile, linear-oblong, smooth, from six to ten-seeded.

*Note.* It differs from C. *sericea* in having very minute, awled stipules and bractes.

7. C. *linifolia. Willd.* iii. 975.

Perennial, erect, sericeous. *Leaves* sessile, narrow cuneiform, obtuse, hoary. *Stipules* none. *Racemes* terminal. *Bractes* small, one-flowered. *Legume* sessile, length of the calyx, from two to three-seeded.

A native of Hindoostan, as well as other parts of India.

8. C. *fulva. Roxb.*

Shrubby, erect. *Leaves* lanceolar, sericeous when young. *Stipules* none. *Racemes* terminal, and from the exterior axills. *Bractes* ovate, recurved, those of the pedicel solitary, those of the calyx paired. *Legume* sessile, oval, hid in the sericeous, permanent calyx, two-seeded.

A native of Mysore, from thence Dr. Buchanan sent the seed to the Botanic garden where in two years the plants blossomed in October and November, and ripened their seed in January. They were then stout, erect shrubs with a single, ligneous trunk, and many ascending branches.

*Bark* of the *young shoots* clothed with much soft, short, white hair. *Leaves* simple, sub-sessile, lanceolate, entire, while young sericeous on both sides, from two to four inches long. *Stipules* none. *Racemes* terminal, and from the exterior axills; the whole forming large, elegant, sub-erect, sericeous panicles, bearing numerous, large, yellow flowers. *Bractes* of the petioles solitary, one-flowered, ovate, recurv-

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ed ; those of the calyx rather narrower, and recurved ; all are permanent. *Calyx* large, yellowish, and sericeous on the outside. *Legume* sessile, hid in the calyx, oval, villous, with the villous, dry, permanent style bent downwards. *Seeds* two, reniform, smooth, light brown.

The sericeous extremities, and numerous large yellow flowers, give to this stately species, a very charming appearance while in blossom.

It differs from König's *sericea*, (see *Retz. Obs.* v. *p.* 29.) in the want of stipules, and disposition of the bractes. C. *linifolia*, (*Suppl.* 322.) is no doubt *juncea*, a plant totally different in every respect.

9. C. *pulcherrima. Roxb.*

Shrubby, erect. *Leaves* obovate-cuneate, villous. *Stipules* none. *Racemes* terminal ; *bractes* of the *pedicels* solitary, cordate, acuminate, refracted ; those of the calyx lanceolate. *Legume* sessile, oblong, hid in the permanent calyx ; *seeds* few.

A native of Mysore, from thence Dr. Buchanan sent the seeds to the Botanic garden at Calcutta in 1801, and in January 1803 the plants blossomed for the first time, and ripened their seed in March. *Trunk* erect, as thick as a walking cane, covered with smooth, ash-coloured bark ; *young shoots* round, and downy. *Leaves* simple, sessile, obovate-cuneate, villous ; length from one to three inches. *Stipules* none. *Racemes* terminal, sometimes compound. *Bractes* of the pedicel solitary, one-flowered, sessile, cordate, acuminate, refracted, villous, and yellow. *Flowers* very large, of a lively bright yellow, and of several days duration. *Bractes* of the calyx opposite, lanceolate, expanding, villous, and not of so deep a yellow as the larger cordate bractes. *Calyx* deeply divided into five unequal segments, and clothed with fine yellow pubescence, permanent. *Legume* sessile, hid in the permanent calyx, oblong, smooth. *Seeds* a few, frequently not more than one comes to perfect maturity.



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10. C. *ramosissima. Roxb.*

Suffruticose, very ramous, hairy. *Leaves* sessile, lanceolar. *Stipules* none. *Racemes* terminal, few-flowered. *Bractes* callous-margined, and revolute. *Legume* sessile, one-seeded.

A native of the interior parts of Bengal, and in blossom most part of the year.

*Root* ramous, perennial. *Stem* scarcely any, but numerous sub-ligneous, small, variously bent, alternate, very hairy *branches* and *branchlets*, spread in every direction; general height of the whole plant about two feet and in diameter fully as much. *Leaves* alternate, sessile, simple, approximate, cuneate-lanceolar, entire; very hairy underneath, size of the largest, about an inch long, and scarcely one-fourth of an inch in breadth.

*Stipules* none. *Racemes* terminal, solitary, few-flowered. *Flowers* pretty large, yellow, tinged with deep purple. *Bractes* of the pedicel solitary; of the calyx paired; all are cordate, with callous, recurved, coloured, smoothish margins and apices. *Calyx; divisions* unequal; the upper two being much larger than the lower three; the margins of all callous, coloured, and recurved. *Legume* oval, hairy, sessile, one-seeded.

11. C. *chinensis. Willd.* iii. 974.

Perennial, diffuse, hairy. *Leaves* bifarious, from oval to linear-obtuse, hairy. *Stipules* at the forks of the branches. *Racemes* terminal. *Bractes* lanceolate. *Legumes* sessile, oval, smooth, many-seeded.

A native of pasture ground, borders of cultivated fields, &c.

*Root* perennial. *Stem* scarcely any, but many, diffuse, round, hairy, two-forked, slender branches, from one to two feet long. *Leaves* alternate, bifarious, short-petioled, linear-lanceolate, obtuse with a bristle, very hairy, entire, generally more than an inch long, and less than half an inch broad. *Stipules* subulate, and only at the divisions of the branches,

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and even there frequently wanting. *Racemes* terminal, twice as long as the pedicels. *Flowers* pretty large, yellow. *Calyx* hairy, nearly as long as the flower. *Legume* sessile, oval, smooth, shining, from fifteen to twenty-five-seeded.

12. C. *rubiginosa. Willd.* iii. 973.

Perennial, diffuse, hairy. *Leaves* oval, and lanceolate, hairy. *Stipules* lanceolate. *Racemes* leaf-opposed. *Bractes* cordate. *Legumes* oval, hairy, few-seeded.

Like the last described, it is a native of pasture lands; it has also a perennial root, with many slender diffuse, round, hairy, two-forked branches.

*Leaves* alternate, short-petioled, bifarious, below round or ovate, above lanceolate, hairy, entire, very various in size. *Stipules* lanceolate, often reflexed. *Racemes* lateral or leaf-opposed, twice as long as the leaves, round, hairy, from four to eight-flowered. *Bractes* solitary, cordate, reflexed, shorter than the pedicels, one-flowered. *Legumes* sessile, oblong, hairy, eight-seeded.

13. C. *cespitosa. Roxb.*

Perennial, diffuse, cespitose, smooth. *Leaves* somewhat wedge-shaped. *Stipules* none. *Racemes* terminal. *Bractes* subulate. *Legumes* sessile, rhombic. *Seeds* from ten to twelve.

*Teling.* Nalla-geri-galli-geetsa.

Is one of the most common all over the coast, grows on pasture ground; is in flower all the year round.

*Root* perennial. *Stem* none. *Branches* numerous, spreading close to the earth in every direction, with their extremities ascending; from one to two feet long, pretty smooth. *Leaves* alternate, inclining to be bifarious, very short-petioled, linear-oblong or wedge-form, sericeous underneath; about three quarters of an inch long, and a quarter broad. *Stipules* none. *Racemes* terminal, very long, ascending. *Bractes* of the pedicel single, awled, one-flowered; those of the

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calyx two, similar, but smaller. *Flowers* small, of a bright yellow, opening in the evening. *Calyx, upper segment* emarginate. *Legume* rhombic, black, smooth, from eight to twelve-seeded. Cattle eat it.

14. C. *prostrata. Roxb.*

Perennial, diffuse, hairy. *Leaves* bifarious, oblong, hairy. *Stipules* none. *Racemes* leaf-opposed. *Legumes* sessile, clubbed, smooth, many-seeded.

*Teling.* Seri-galli-geetsa.

This is an uncommon species on the coast; like the former, it grows on pasture ground, has a perennial woody root, with many slender, hairy, diffuse, two-forked, round branches, from one to two feet long, their lower part often becomes woody, and perennial.

*Leaves* alternate, bifarious, short-petioled, obliquely-oblong, hairy, about an inch long, and half an inch broad. *Stipules* wanting. *Racemes* leaf-opposed, axillary, or terminal, three or four times longer than the leaves, from six to twelve-flowered. *Bractes* minute. *Flowers* small, yellow. *Legume* sessile, clubbed, smooth, from sixteen to twenty-four seeded.

15. C. *hirsuta. Willd.* iii. 978.

Sub-herbaceous, flaccid, hairy. *Leaves* oval, hairy. *Stipules* semi-lanceolate. *Racemes* leaf-opposed, long, from three to four-flowered. *Bractes* cordate, recurvate. *Legumes* sessile, hairy, clubbed, few-seeded.

*Teling.* Nalla-galli-geetsa.

This species is scarce, it generally grows among low brush-wood, on dry ground. Flowers during the wet season.

*Root* perennial. *Stem* scarcely any, but many two-forked, small, slender, bifarious branches, spreading on the ground, or climbing up amongst shrubs; from one to several feet long, round, hairy. *Leaves* alternate, bifarious, short-petioled, from broad-oval to oblong, hairy, from one to two inches long, and

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one, or one and a half broad. *Stipules* half-lanceolate, reflexed. *Racemes* lateral, or leaf-opposed, three or four times longer than the leaves, from three to six-flowered. *Bractes* cordate, reflexed, shorter than the pedicels. *Flowers* opening in the evening only, very large, yellow; the back of the banner and sometimes the wings beautifully spotted with purple. *Calyx* large; *segments* slender, hairy. *Legumes* sessile, clubbed, very hairy, from eight to ten-seeded.

16. C. *uniflora. Kön. Mss.*

Sub-herbaceous, procumbent, hairy. *Leaves* bifarious, obliquely cordate, hairy; no stipules. *Flowers* solitary, axillary. *Legumes* sessile, reniform, one or two-seeded.

Hallia *hirta. Willd.* iii. 1169.

*Teling.* Nalla benda.

A small, procumbent species, with perennial roots, and annual branches, a native of pasture ground. Flowers in the cold season.

*Stems* none. *Branches* many, spreading every way, and pressing also on the ground, about a foot long, and as thick as a packthread, two-forked, round, hairy. *Leaves* alternate, bifarious, sub-sessile, obliquely-cordate, of a dirty brownish green, particularly round the edges, hairy, about five-eighths of an inch long, and three-eighths broad. *Stipules* wanting. *Peduncles* axillary, short, one-flowered, about the middle articulated, with a small bracte. *Flowers* small, yellow. *Calyx* hairy. *Banner* obcordate, having the processes of *Dolichos. Legume* sessile, compressed, diaphanous, one or two-seeded.

17. C. *Nummularia. Willd.* iii. 979.

Sub-herbaceous, diffuse, hairy. *Leaves* cordate, hairy. *Peduncles* leaf-opposed, long, two-flowered. *Legumes* sessile, globular, hairy, many-seeded.

C. *nana. Burm. Ind. t.* 48. *f.* 2.

This is no doubt the species called by Dr. König, *biflora,*

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though it agrees better with Willdenow's *Nummularia* than his *biflora*, they are probably the same.

*Teling.* Pillee-watta tiga.

A native of shady pasture ground, about hedges, &c. Flowers during the wet and cold seasons.

*Root* perennial. *Stem* scarcely any. *Branches* many, spreading amongst the grass, round, hairy, two-forked, from one to two feet long. *Leaves* alternate, sub-sessile, bifarious, obliquely cordate-ovate, or oblong, hairy, about three quarters of an inch long and half an inch broad. *Stipules* wanting. *Peduncles* leaf-opposed, longer than the leaves, round, hairy, near the apex two-forked, two-flowered. *Bractes* awled, hairy. *Legume* sessile, oval, or globular, size of a field bean, hairy, seed crowded, from twelve to twenty, kidney-form.

18. C. *retusa. Willd.* iii. 976.

Annual, and biennial. *Leaves* oblong-cuneate, slightly retuse. *Stipules* small. *Racemes* terminal. *Bractes* ensiform, recurved. *Legume* sessile, clavate, smooth, many-seeded.

Tandale cotti. *Rheed. Mal.* ix. *t.* 25.

*Teling.* Potu-galli-geetsa.

*Beng.* Beel-jhunjhun.

C. *major. Rumph. Amb.* v. *t.* 96. *f.* 1.

A common, but elegant plant, found in most parts of India. Flowering time the cool season.

*Root* often biennial, or more. *Stem* straight, but very short, with several, ascending branches rising from it a little above the ground, they are all slightly furrowed, otherwise round, and nearly smooth, general height of the whole plant about two feet. *Leaves* scattered, short-petioled, oblong-cuneate, with the apex oftener rounded than retuse, smooth on both sides, from one to three inches long. *Stipules* minute, acute, spreading. *Racemes* terminal, erect, many-flowered. *Flowers* drooping, large, of lively yellow, with the back of the banner tinged with red. *Bractes* solitary, ensiform, one-

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flowered, recurved. *Legume* turgid, sub-sessile, clavate, smooth, many-seeded.

19. C. *sericea. Willd.* iii. 975.

Annual, erect, ramous, furrowed. *Leaves* simple, sub-sessile, from obovate-cuneate, to lanceolate. *Stipules* semi-cordate. *Racemes* terminal. *Bractes* cordate. *Legume* sessile, oblong, smooth, many-seeded.

C. *sericea. Retz. Obs.* v. *p.* 26.

*Sans.* Ghuntaruva.

*Beng.* Peeyooli, Jhunjhun.

A native of Bengal. Flowering and seed time the cold season.

*Root* ramous, generally annual. *Stem* erect, with a few sub-erect, furrowed, slightly pubescent branches; height of the whole plant from four to eight feet. *Leaves* simple, sub-sessile, obovate, the superior ones narrower, entire, with a minute bristle from the obtuse apex, from three to six inches long, and from one to three broad. *Stipules* semi-cordate, acute, about as long as the short vermicular petioles, permanent. *Racemes* terminal, from one to two feet long, round, smooth. *Bractes* cordate, reflexed, one-flowered, embracing the base of the pedicels; two minute sub-opposite ones near the base of the pedicels. *Flowers* very large, of a lively yellow. *Banner* with the callosities of *Dolichos* near the base. *Legume* sub-sessile, linear-oblong, smooth, inflated, many-seeded.

If the above plant is König's, or rather Retz's *sericea*, which can scarcely be doubted, the specific name is ill applied, for there is nothing sericeous about it, a few depressed hairs is all the pubescence I have been able to discover.

20. C. *verrucosa. Willd.* iii. 977.

Annual, erect, angular. *Leaves* sub-ovate, rugose. *Stipules* semi-cordate, reflexed. *Racemes* leaf-opposed. *Bractes* subulate. *Legume* sessile, many-seeded.

Pee-tandale-cotti. *Rheed. Mal.* ix. *t.* 29.



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21. C. *alata. Roxb.*

Herbaceous; *branches* two-winged. *Leaves* simple, sessile, obliquely round-ovate, downy. *Racemes* terminal, becoming lateral. *Legume* short-pedicelled, linear-oblong, smooth.

Found in Hindoostan by Captain Hardwicke in flower in July and August.

22. C. *semperflorens. Willd.* iii. 978.

Shrubby, erect, ramous, smooth. *Leaves* ovate; *stipules* falcate, reflexed. *Racemes* terminal, becoming lateral. *Bractes* subulate, one-flowered. *Legume* sessile, clavate.

A native of Sumatra. Flowering in the cold season, in the Botanic garden at Calcutta. The flowers are of a middling size, and bright yellow. Is not far removed from *verrucosa.*

23. C. *bialata. R.*

Perennial, spreading; *branches* two-winged. *Leaves* subsessile, from lanceolar to oblong. *Peduncles* lateral, long, and smooth.

A native of Silhet. In the Botanic garden it grows to be a pretty large bushy spreading shrub, with little or no stem, but many sub-ligneous, naked, spreading branches, which divide into ascending, broad-winged, villous branchlets. Flowers and ripens its seed during the rainy and cool seasons.

24. C. *angulosa. Lamarck's Encycl.* ii. 196.

Annual. *Stem* and *branches* from three to five-sided. *Leaves* sub-sessile, base sub-ovate, much attenuated, and curled. *Stipules* semi-cordate, transverse. *Racemes* lateral.

A native of the Mauritius.

25. C. *paniculata. Willd.* iii. 980.

Shrubby, very ramous and hairy. *Leaves* simple, cuneate, sub-sessile. *Stipules* subulate, recurved. *Panicles* ter-

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minal, large. *Bractes* numerous, subulate, recurved, clammy. *Legumes* sessile, villous, one-seeded.

From plants two years old, reared in the Botanic garden from seed received from Dr. John at Tranquebar, the accompanying drawing and this description are taken. Flowering time, in Bengal, the cold season; seed ripens in March.

*Trunk* short. *Branches* numerous, spreading in every direction, round, clothed with much soft hair. *Branchlets*, immediately under the panicle generally destitute of leaves, but garnished with many fasciculi of the clammy, stipulary leaflets; whole height of the plant from two to four feet, spreading to a considerably greater extent. *Leaves* simple, sub-sessile, cuneate, hairy like the young shoots. *Stipules* in axillary fascicles, subulate, recurved; margin revolute; upper surface clammy. *Panicles* terminal, large, from one to two feet long, composed of simple, expanding racemes. *Bractes* like the stipules. *Flowers* large, yellow, smelling rather offensively. *Banner*, two callosities at the base, as in *Dolichos*, downy on the back. *Germ* one or two-seeded. *Legumes* sessile, oval, downy, about as long as the long, slender acute divisions of the calyx, generally one-seeded.

SECT. II. *Leaves compound.*

26. C. *laburnifolia. Willd.* iii. 982.

Shrubby, erect. *Leaves* ternate; *leaflets* obovate, smooth. *Stipules* none. *Racemes* terminal. *Legumes* pedicelled, club-bed, many-seeded.

Nella-tandale-cotti. *Rheed. Mal.* ix. *t.* 27.

*Beng.* Munna.

*Teling.* Munna or Pedda-galli-geetsa.

C. *arborescens. Burm. Zeyl. t.* 25.

An elegant, large shrubby, broom-like species; common on the southern parts of the coast. Flowers most part of the year.

*Stem* erect, woody. *Branches* several, ascending; the



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whole plant from four to six feet high. *Leaves* terminal, long-petioled. *Leaflets* nearly equal, obovate, with a point, entire, smooth; about an inch long, and three quarters of an inch broad. *Stipules* wanting. *Racemes* terminal, large, many-flowered. *Pedicels* pointed, and bracted near the apex. *Bractes* of the pedicels small, one-flowered. *Flowers* large, of a bright showy yellow. *Wings* half the length of the banner, and keel. *Legume*, pedicels clubbed, smooth. *Seeds* numerous, kidney-shaped. Cattle eat it.

27. C. *orixensis. Roxb.*

Perennial, procumbent. *Leaves* ternate. *Leaflets* obovate, pretty smooth. *Racemes* lateral, long. *Bractes* cordate. *Legumes* pedicelled, cylindric, smooth, few-seeded.

*Teling.* Koona-galli-geetsa.

Like most of the rest, this is a native of pasture ground, borders of cultivated fields, &c.

*Root* perennial, white, woody. *Stems* several, procumbent; *racemes* round, hairy, from two to three feet long. *Leaves* ternate. *Leaflets* oblong, or obovate, entire, smooth on the upper side, a little hairy underneath; about an inch long and rather more than half an inch broad. *Petioles* as long as the leaflets. *Stipules* lanceolate, hairy. *Racemes* lateral, or leaf-opposed, erect, very long. *Flowers* small, remote. *Bractes* cordate, reflexed, one-flowered. *Pedicels* long, slender. *Legumes* pedicelled, pendulous, cylindric, smooth, from eight to twelve-seeded.

28. C. *cytisoides. Roxb.*

Shrubby. *Leaves* ternate; *leaflets* alike, oblong, acute, glaucous underneath. *Stipules* minute, permanent. *Racemes* terminal. *Legume* sessile, linear-oblong, downy, few-seeded.

From Nepal Dr. Buchanan sent the seeds to this garden, where the plants blossom during the dry season chiefly.

*Trunk* tolerably erect, with many spreading branches,

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forming a large ramous shrub, of about six or seven feet in height; *young shoots* round, and clothed with fine, minute pubescence. *Leaves* ternate; *leaflets* nearly equal, oblong, or broad-lanceolar, deep green on the upper side, paler underneath; from one and a half to two inches long, and less than one in breadth. *Petioles* slender, channelled, villous. *Stipules* small, with a broad base, and subulate apex, permanent. *Racemes* at first terminal, becoming lateral as the branches extend in length. *Flowers* numerous, pretty large, pale yellow. *Bractes* of the pedicels solitary, one-flowered, small, lanceolate; those of the calyx larger and inserted obliquely on its base. *Calyx* of five equal divisions. *Legume* sessile, oblong, compressed, villous, about an inch long, and less than half that in breadth. *Seeds* few, obliquely-reniform.

29. C. *trifoliastrum. Willd.* iii. 983.

Shrubby, erect. *Leaves* ternate; *leaflets* cuneate, emarginate. *Stipules* filiform. *Racemes* terminal. *Legumes* sessile, smooth, four-seeded.

C. *Bengalensis*, &c. *Pluck. Alm. t.* 169. *f.* 5.

*Teling.* Naga-galli-geetsa.

A pretty large, erect, shrubby species; growing about hedges, borders of cultivated land, &c.

*Root* woody, yellow. *Stems* several, erect, woody, branchy. *Branches* twiggy, a little downy, the whole plant from one to four feet high. *Leaves* ternate. *Leaflets* broad-wedge-formed, or obcordate, emarginate with a bristle, above smooth, below with a few hairs, about an inch long, and half an inch broad. *Petioles* as long as the leaflets, channelled. *Stipules* subulate. *Racemes* terminal, or branchlet-opposed, long, straight, many-flowered. *Bractes* of the pedicel subulate, one-flowered; of the calyx two, opposite, minute. *Flowers* yellow. *Legume* sessile, almost globular, size of a pea, smooth, two-seeded.

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whole plant from four to six feet high. *Leaves* terminal, long-petioled. *Leaflets* nearly equal, obovate, with a point, entire, smooth; about an inch long, and three quarters of an inch broad. *Stipules* wanting. *Racemes* terminal, large, many-flowered. *Pedicels* pointed, and bracted near the apex. *Bractes* of the pedicels small, one-flowered. *Flowers* large, of a bright showy yellow. *Wings* half the length of the banner, and keel. *Legume*, pedicels clubbed, smooth. *Seeds* numerous, kidney-shaped. Cattle eat it.

27. C. *orixensis. Roxb.*

Perennial, procumbent. *Leaves* ternate. *Leaflets* obovate, pretty smooth. *Racemes* lateral, long. *Bractes* cordate. *Legumes* pedicelled, cylindric, smooth, few-seeded.

*Teling.* Koona-galli-geetsa.

Like most of the rest, this is a native of pasture ground, borders of cultivated fields, &c.

*Root* perennial, white, woody. *Stems* several, procumbent; *racemes* round, hairy, from two to three feet long. *Leaves* ternate. *Leaflets* oblong, or obovate, entire, smooth on the upper side, a little hairy underneath; about an inch long and rather more than half an inch broad. *Petioles* as long as the leaflets. *Stipules* lanceolate, hairy. *Racemes* lateral, or leaf-opposed, erect, very long. *Flowers* small, remote. *Bractes* cordate, reflexed, one-flowered. *Pedicels* long, slender. *Legumes* pedicelled, pendulous, cylindric, smooth, from eight to twelve-seeded.

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Shrubby. *Leaves* ternate; *leaflets* alike, oblong, acute, glaucous underneath. *Stipules* minute, permanent. *Racemes* terminal. *Legume* sessile, linear-oblong, downy, few-seeded.

From Nepal Dr. Buchanan sent the seeds to this garden, where the plants blossom during the dry season chiefly.

*Trunk* tolerably erect, with many spreading branches,

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29. C. *trifoliastrum. Willd.* iii. 983.

Shrubby, erect. *Leaves* ternate; *leaflets* cuneate, emarginate. *Stipules* filiform. *Racemes* terminal. *Legumes* sessile, smooth, four-seeded.

C. *Bengalensis*, &c. *Pluck. Alm. t.* 169. *f.* 5.

*Teling.* Naga-galli-geetsa.

A pretty large, erect, shrubby species; growing about hedges, borders of cultivated land, &c.

*Root* woody, yellow. *Stems* several, erect, woody, branchy. *Branches* twiggy, a little downy, the whole plant from one to four feet high. *Leaves* ternate. *Leaflets* broad-wedge-formed, or obcordate, emarginate with a bristle, above smooth, below with a few hairs, about an inch long, and half an inch broad. *Petioles* as long as the leaflets, channelled. *Stipules* subulate. *Racemes* terminal, or branchlet-opposed, long, straight, many-flowered. *Bractes* of the pedicel subulate, one-flowered; of the calyx two, opposite, minute. *Flowers* yellow. *Legume* sessile, almost globular, size of a pea, smooth, two-seeded.

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to four inches long, and from half an inch to an inch broad; the inferior ones smaller. *Petioles* as long as the largest leaflets, three-sided, with a groove on the upper side. *Stipules* reflexed. *Racemes* terminal, long, erect, many-flowered. *Bractes* single, one-flowered, lanceolate. *Flowers* large, yellow. *Stamens* and *anthers* as in the genus; the round anthers are here nearly twin, so much are their lobes divided.

*ARACHIS. Schreb. gen. N.* 1177.

*Perianth* with a long filiform tube, supporting the corol, and stamina, or its mouths. *Corol* papilionaceous. *Filaments* connected in one tube (a groove,) but no fissure on the back.

1. A. *hypogea. Willd.* iii. 1346.

Annual, diffuse. *Leaves* twice paired. *Legumes* growing under the surface of the ground.

Chamæbalanus japonica. *Rumph. Amb.* v. *t.* 156. *f.* 2.

*Hind.* Moong-phullee.

This very useful and common plant is to be found in all the warmer parts of Asia. Though in Bengal it appears to be rather scarce, nor have the natives any name for it, though those of other provinces have. It is also universally known in Europe, yet a full and accurate description with figures seems still to be wanting. Its parts of fructification appear to me to have been overlooked by every Botanical writer I have yet met with, on that account I have been obliged to give it a new *essential generic character* and its *natural character* at full length, from which it will be seen that this plant is in fact a *Stylosanthes.* However as its present generic name, *Arachis*, is so universally known, I think it will be better to continue it, and to place the only species of *Stylosanthes* known to me with it; for they clearly make but one genus. I have at this instant both the living plants before me in high perfection, and after repeated examination, can safely say

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that the *essential generic character* of two such widely distinct species, seldom agrees so well as in these two, (viz. *Arachis hypogea, Linn.* and *Stylosanthes mucronata. Willd.*

*Root* annual. *Stems*, or rather *branches* many, diffuse, hairy, from two to four feet long. *Leaves* alternate, pinnate. *Leaflets* two pair, oval and obovate, slightly hairy underneath. *Petioles* longer than the leaflets, with the base enlarged into a stem-clasping sheath, with two ensiform processes. *Flowers* axillary, two or three together, blossoming in succession. *Bractes* a common exterior pair to the fascicle, and small proper ones to the several flowers; all are membranaceous, tapering to a fine point, and ciliate. *Calyx* with a very long, filiform, slender tube; *mouths* two-parted; the *upper lip* three-cleft, with the middle division emarginate; the *lower lip* lanceolate, and rather longer. *Corol* papilionaceous, resupinate, of a bright yellow colour. *Banner* round, emarginate, large in proportion to the other petals, inserted with the wings and carina partly on the base of the staminiferous tube, and partly on the mouths of the tube of the calyx. *Wings* free, obliquely-ovate, concave, longer than the carina, which is at the base two-parted; the upper half incurved and subulate. *Filaments* ten, united into one fleshy tube, with a groove, but no opening on the upper side. *Anthers* alternately sagittate and ovate. *Germ* ovate, lodged on the very base of the sessile tube of the calyx. *Style* long and slender. *Stigma* even with the anthers, and bearded on the inside. *Legume* oblong, leathery, swelled at each seed, reticulated with prominent nerves, one-celled, not opening spontaneously, nor are the sutures very conspicuous; length various, but in general about as thick as the little finger. *Seeds* from one to four, ovate, smooth, of the size of a French bean. The manner in which the young minute germ of the plant acquire pedicels, sufficiently long to allow them to thrust themselves into the ground to the depth of one, two, or even three inches, where they grow and ripen their seed, is truly wonderful. To understand this admirable economy, it must be observed



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that the flowers are most perfectly sessile, two, three, or four in the axills of the leaves, and that the germ is lodged in the very base of the tube of the calyx. Soon after the flower decays the germ acquires pedicels, after which it lengthens fast, it then enters the earth, and when the legume is perfectly formed, it will generally be found as deep in the earth as when full grown, I therefore conceive that it buries itself to its greatest depth before the seeds begin to enlarge, and while the germ is only an obtuse point.

The uses of the seed of this plant, are too universally known to render any account of them necessary in this place.

2. A. *fruticosa. Retz. Obs.* iv. *N.* 67.

Trifolium procumbens. *Burm. Zeyl. p.* 206. *t.* 106. *f.* 2. bad.

Stylosanthes *mucronata. Willd.* iii. 1166.

*Teling.* Saillee-kumpa.

This small, spreading, ramous, under shrub, is now common in the Botanic garden at Calcutta, first reared from seed sent by the Rev. Dr. John at Tranquebar. The plant is indigenous in Ceylon. *Leaves* alternate, ternate. *Leaflets* ovate, acuminate, slightly ciliate; scarcely half an inch long. *Petioles* at the base enlarged into a sagittate, stem-clasping sheath, which ends in two lateral acute points, one on each side. *Flowers* axillary, sessile, solitary, or in small terminal strobiliform heads. *Bractes* one-flowered. *Calyx; tube* long, slender, villous; *border* five-parted, the inferior division lengthened. *Corols* papilionaceous. The petals inserted partly on the base of thick fleshy staminiferous tubes, and partly on the mouth of the tube of the calyx. *Filaments* ten united into one tube at the base, with only the appearance of a fissure on the upper side. *Anthers* alternately linear, and ovate. *Germ* oblong, lodged in the base of the tube of the perianth. *Style* long, slender, passing through the whole tube of the calyx, elevating the acute stigma

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rather above the anthers. *Legume* of one or two joints, with a single seed in each.

### *CARPOPOGON. R.*

*Calyx* irregularly from four to five-parted. *Banner* cordate, incumbent on, and shorter than the unexpanding wings, and keel. *Stamina* one and nine. *Anthers* alternately round, and sagittate. *Stigma* bearded.

1. C. *pruriens. Roxb.*

Annual, twining. *Racemes* pendulous. *Legumes* armed with stinging hairs.

Dolichos *pruriens. Linn. Supp.* 657. *&c.*

Nai-corana. *Rheed. Mal.* viii. *t.* 35.

*Teling.* Doola gonda.

*Sans.* Murkuti. Atma goopta or Kupikuchoo.

*Beng.* Alkooshee.

Common in hedges, in most parts of India. Flowering time the cold season.

I have never been able to learn that the natives of these parts of India, make any use of any part of this plant, except the hairs of the legumes which they do not use as a medicine, (vermifuge) but as an ingredient to help to poison wells. However its having been of late taken inwardly to destroy worms, proves that it is not that poison they take it for; and it is more than likely that the other plants employed for the same base end, are fortunately much less dangerous than those who employ them imagine. Indeed it is only the most ignorant, superstitious Poligar mountaineers who are known to attempt to poison water. Nor can it be done to any other than such as is confined in wells, or small tanks.

2. C. *monospermum. Roxb.*

Perennial, twining; *umbels* axillary, pendulous. *Legume*



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one-seeded, and armed with very stiff ferruginous burning hairs.

*Teling.* Pedda, or Enooga doola-gunda, which means the larger or Elephant's *scratch wort.*

This species is perennial, and as large as any of the twining *Dolichoses* I know. It is a native of hedges, and thickets, on the banks of rivers, and water courses. Flowers during the cold season. Seeds ripen in April.

*Stem* woody, perennial, twining, branchy; *young shoots* covered with brown down. *Leaves* ternate. *Leaflets* ovate, acute, downy on the under side; when young they are covered with much rust-coloured down; about three inches and a half long and two broad. *Stipules* of the petioles lanceolate, hairy, falling, those of the leaflets subulate. *Umbels* axillary, short-peduncled, drooping from the weight of the flowers. *Bractes* and *flowers* as in C. *pruriens.* *Calyx* covered with burning hairs, unequally five-toothed, the undermost long and pointed, the rest scarcely appear above the margins of the cup. *Corol, stamens* and *pistil* as in C. *pruriens.* *Legume* semi-oval, deeply grooved on the back, as in *Lathyrus sativus*, very much wrinkled, pointed, about three inches long and two broad, covered with much, exceedingly stiff, brown hair, which produces a greater degree of pain and itching than that of C. *pruriens.* *Seed* solitary, kidney-formed, of the size of the first joint of the thumb, the convex side is entirely surrounded with the hilum.

I know of no use any part of this plant is put to. Cattle do not eat it.

3. C. *capitatum. R.*

Annual, twining. *Heads* axillary, sub-sessile. *Legumes* armed with soft, velvet-like down.

*Teling.* Soorootoo.

This I have only found in a cultivated state, and that during the cold season, in the gardens of the natives. It is an annual.

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*Stem* herbaceous, twining, branchy, running to an extent of ten or twelve feet, if supported; *young shoots* slightly downy. *Leaves* ternate. *Leaflets* equal in size, the *exterior* ones ovate, about three inches long, and two broad, the lateral ones obliquely cordate, all are entire and obtuse, above smooth, a little downy underneath. *Stipules* of the petioles broad-lanceolate, of the leaflets subulate. *Peduncles* axillary; short, many-flowered. *Bractes*, *flowers*, *stamens*, and *pistil* as in C. *pruriens*. *Legumes* cylindric, depending, a little curved, about as thick as the fore finger, or thumb, and about six inches long, covered with soft, velvet-like down, when ripe wrinkled longitudinally. *Seeds* five or six, of the size of a small garden bean, smooth, shining, black.

The young pods like those of *Dolichos lignosus* and *lablab* are used by the natives in their curries, after rubbing off the down that covers them.

4. C. *niveum. Roxb.*

Annual, twining. *Racemes* pendulous. *Legumes* from six to eight-seeded, while young downy; when old destitute of down, and wrinkled.

*Beng.* Khamach.

Like *Carpopogon capitatum*, I have only found this in a cultivated state and even then very uncommon, having seen it but in one or two gardens near Calcutta; however, if it is not indigenous in Bengal, it must have been long known to the natives, not only on account of their having a vernacular name for it, but because it is eaten by them, as a Hindoo requires a long and intimate acquaintance with any article before he makes it a part of his diet. *Potatoes* they must have known fifty years or more, before they began to admit them at their tables.

Be that as it may, the plant is cultivated during the cold season, when it blossoms and produces fruit in great abundance.

*Root* ramous, generally annual, though in some soils it lasts

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longer. *Stem* twining to an extent of some fathoms, very ramous and thick, but of a spongy, succulent nature; *young shoots* a little villous. *Leaves* ternate. *Leaflets* entire, the pair nearly semi-cordate, the terminal one rhomboidal; all have short acute points, and are nearly equal in size, of a soft delicate texture, and slightly villous on both sides; from four to ten inches long. *Petioles* round, slightly villous, from six to twelve inches long. *Stipules* lanceolate. *Racemes* axillary, solitary, pendulous, often as long, or even longer than the leaves, bearing numerous, three-fold, pendulous, very large, white flowers. *Bractes* four-fold, a common one to each tubercle of the racemes, on which the three flowers are inserted, and one to each of the proper pedicels, all are caducous, nearly lanceolate, and villous. *Calyx* four-parted. The upper division broad, and emarginate; the lower one narrowest, and more lengthened than the lateral pair. *Corol* papilionaceous. *Banner* cordate, incumbent on the wings and keel, and about half their length. *Wings* oblong, with a remarkable callous gland near the base of each. *Keel* one-petalled, linear, length of the wings, with a sharp, rigid, incurved point. *Nectary* a crenulate gland round the insertion of the germ. *Filaments* one and nine, alternately clavate and filiform, with long linear, sub-sagittate, anthers on the slender filaments, and short-ovate ones on the clavate ones. *Germ* hairy. *Style* slender and villous. *Stigma* small. *Legume* linear, about six inches long, curved a little like an Italic *S.* when ripe black, destitute of down, and longitudinally wrinkled. *Seeds* generally from six to eight, oval, smooth, ash-coloured, and separated by thin partitions.

By removing the exterior velvet-like skin of the large, fleshy, tender legumes, they are when dressed, like French beans (*Phaseolus vulgaris,*) a most excellent vegetable for our tables, and the full grown beans are scarcely inferior to the large garden beans of Europe.

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5. C. *atropurpureum. R.*

Perennial, twining. *Racemes* pendulous, often compound. *Legume* elliptic, one or two-seeded, deeply furrowed, and armed with much brown burning hair.

*Tam.* Tilla-kodi.

An extensive twining permanent species, a native of Travancore, from thence introduced into the Botanic garden, where it flowers in February and March, and the seed ripens in April and May.

6. C. *giganteum. R.*

Perennial, twining. *Umbels* pendulous. *Legumes* from three to six-seeded; *surface* even and armed with stiff, ferruginous burning brown hairs.

Dolichos giganteus. *Willd.* iii. 1041.

Kaku valli. *Rheed. Mal.* viii. *t.* 36.

A very extensive, twining, perennial species, with large simple pendulous, globular corymbs of large beautiful sulphur coloured flowers, which appear during the rains and cool season, and the seed ripens in March, April, and May.

*PHASEOLUS. Schreb. gen. N.* 1180.

*Keel* with the stamina and style spirally twisted.

SECT. I. *Twining.*

1. P. *vulgaris. Willd.* iii. 1030.

Twining. *Flowers* racemed in pairs. *Bractes* smaller than the calyx. *Legumes* pendulous.

Common in gardens all over India, where indigenous uncertain.

2. P. *lunatus. Willd.* iii. 1031.

Biennial. *Flowers* racemed in threes. *Legumes* scimitar-shaped, smooth.

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3. P. *maximus. Sloan. Jam. t.* 111. *f.* 1.

There are several varieties (six I know,) of this; all are cultivated for our tables. The natives rarely use any part of the plant, nor have they any vernacular name for it, hence I doubt its being a native of India. Seed sent me from North America under the name *Lima bean*, grew and produced another (a white seeded) variety of the same species.

4. P. *alatus. Willd.* iii. 1034.

Perennial, smooth. *Flowers* racemed, in pairs with a gland between. *Nectary* within the stamina, five-toothed. *Legumes* pedulous.

*Teling.* Kar-alsanda.

*Beng.* Bun burbutee.

Katu paeru. *Rheed. Mal.* viii. *t.* 42.

The legumes in Dillenius's figure are straighter and more pointed, than in our East India plant.

A native of Bengal. Flowers in the cold season. This is by far the largest flowered *Phaseolus* I know.

5. P. *sublobatus. R.*

Annual, very hairy. *Leaflets* slightly lobed. *Peduncles* long, twining, and proliferous. *Legumes* cylindric, hairy, fourteen or fifteen-seeded.

*Beng.* Gora moog.

This plant I have only found in Bengal where it is indigenous. Flowering time the end of the cold and hot seasons.

*Stems* twining, very hairy, from three to five feet long, including the proliferous, twining peduncles. *Leaves* ternate. *Leaflets*, the lateral ones gibbous on the outside, the middle one somewhat three-lobed, all are hairy, but much less so than the stems, branches, and petioles; from two to three inches long, and about one and a half or two broad. *Petioles* the length of the leaflets, channelled, very hairy. *Stipules* adjoined, lanceolate-oblong, ciliate. *Peduncles* axillary, and terminal, the latter very long, proliferous, twining, and pretty smooth,

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when compared to the rest of the plant. *Flowers* collected on oblong, terminal, glandular heads, pretty large, of a dirty greenish-yellow colour. *Legumes* cylindric, hairy, from ten to fifteen-seeded. *Seeds* dark gray, sub-cylindric, and separated by membranaceous partitions.

Children eat the seed, the plant is too much clothed with stiff long hairs, to be liked by cattle.

6. P. *calcaratus. Roxb.*

Biennial, villous. *Leaflets* somewhat three-lobed. *Stipules* lanceolar, adnate. *Racemes* elongated. *Bractes* two-flowered, with a gland between. *Carina* with a remarkable long horn. *Legumes* cylindric, pendulous, smooth, many-seeded.

Found in a cultivated state in Mysore by Mr. Benjamin Heyne, and by him the seed was sent to the Botanic garden, where the plant thrives remarkably well, and is in blossom, and ripens its seed the greatest part of the year.

*Root* at least biennial. *Stem* and *branches* twining, somewhat hairy, the whole plant from three to four, or more feet long. *Leaves* ternate. *Leaflets* nearly equal, the pair obliquely ovate-cordate, and generally more or less three-lobed; the terminal one sub-ovate, all are slightly villous, from four to five inches long, and from two to three broad when full grown. *Stipules* of the petiole adnate, lanceolar, those of the leaflets subulate. *Racemes* axillary, generally solitary or in pairs, sub-erect, longer than the leaves, the flower-bearing portion elongated, a rare circumstance amongst the Indian *Phaseoli*. *Bractes* of the pedicels three-fold, two-flowered, lanceolate, caducous; those of the calyx narrower, and more permanent. *Pedicels* short, with a large glandulous knob between their insertions. *Flowers* yellow, large and ornamental. *Keel* paler-coloured than either the banner or wing, and the horn on the right side (that is when looking on the back of the keel) is in this species remarkably large, thence the specific name. *Legumes* pendulous, slender, nearly straight,



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cylindric, smooth; in general two or two and a half inches long. *Seeds* six or seven, dark brownish black, smooth, subcylindric.

7. P. *dolichoides. Roxb.*

Perennial, hairy. *Leaflets* entire, broad-rhomboidal. *Stipules* ovate-lanceolate. *Racemes* axillary, longer than the petioles. *Flowers* in pairs, from numerous approximated glands. *Keel* hornless. *Legume* straight, cylindric, very hairy; *seeds* from six to eight, in very distinct cells.

A native of Chittagong, where it blossoms during the rains, and ripens its seeds in the cool season.

*Root* ramous, perennial. *Stem* and *branches* twining to an extent of some fathoms, round, and hairy. *Leaflets* entire, hairy; the pair obliquely rhombiform, the single one much larger, and broad-rhombiform, being nearly as broad as long. *Petioles* slightly channelled, hairy. *Stipules* from oblong to ovate-lanceolate, hairy. *Racemes* axillary, solitary, erect, longer than the petioles, supporting numerous, large, short-pedicelled, dark purple flowers, inserted by pairs, on large approximated, smooth glands. *Bractes* oval, a single, caducous, common one at the base of each gland of the raceme; another more permanent one at the base of each pedicel, and lastly two pressing on the calyx laterally. *Keel* without a horn, and less twisted than usual. *Legume* straight, cylindric, as thick as a child's finger, and about three inches long, densely covered with soft light brown hairs, like plush, inwardly separated into as many very distinct perfectly round cells as there are seeds. *Seeds* six or seven, oval, of the size of a pea, speckled, with short, very dark-coloured hairs on a lighter coloured integument.

I do not find that any part of the plant is usefully employed, but its dark purple flowers render it ornamental.

8. P. *minimus. Roxb.*

Annual, twining. *Leaflets* ovate. *Flowers* few, capitate,

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long-peduncled, the horn of the keel long and sharp. *Legumes* cylindric, smooth, from six to seven-seeded.

*Chin.* Chamloe-to.

A native of China, reared in the Botanic garden from seed received from Canton, and like most of the other leguminous plants, succeeds best during the dry season.

*Root* annual. *Stems* twining, filiform, of very humble growth, and almost smooth. *Leaves* ternate. *Leaflets*, the pair obliquely ovate-cordate, the terminal one two inches long. *Stipules* lanceolar, adnate, both acute. *Peduncles* axillary, solitary, about as long as the leaves, angular and rather harsh, each supporting a small head of a few pairs of small greenish yellow flowers, each pair inserted in a small green gland. *Stipules* lanceolate, caducous. *Calyx* campanulate, unequally five-toothed. *Banner* of an inverse reniform shape. *Keel* twisted; on the right side a long, sharp horn, which I find common to two thirds of the genus. *Legumes* cylindric, smooth, slightly incurved, scarcely two inches long. *Seeds* from four to eight, sub-cylindric, smooth, dark gray.

I do not know any of the uses of this small species, nor do I think, from its size and appearance in Bengal, that it can be applied to any useful purpose.

SECT. II. *Not twining.*

9. P. *nanus. Willd.* iii. 1036.

Annual, with weak spreading branches. *Bractes* larger than the calyx. *Legumes* pendulous, compressed, one of the smallest of the annual cultivated sorts of *Phaseoli.*

10. P. *glaber. Roxb.*

Annual; *stipules* obliquely ovate, adnate. *Leaflets* subcordate, entire. *Heads* long-peduncled. *Spur* of the *keel* remarkably large. *Legume* straight, cylindric, smooth, many-seeded.



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The seeds of the species were received into the Botanic garden, from the Mauritius, where I am informed the plant is cultivated under the name *Lentille De Creole.*

*Stem* scarcely any, but numerous, short, ramous, ascending, round, smooth branches; height of the whole plant, in our rich soil of Bengal, about two feet, and spreading fully as much. *Leaves* ternate. *Leaflets* of the pair obliquely cordate, the terminal one trapeziform, all are entire, and tolerably smooth on both sides. *Heads* solitary, short, on long, round, smooth, peduncles. *Flowers* in pairs, short-pedicelled; one on each side of a large, roundish gland, large, of a bright yellow. *Bractes* of the pedicel solitary, lanceolate; of the calyx in pairs, lanceolate. *Banner* very broad, reniform. *Horn* of the keel remarkably long and pointed. *Legume* cylindric, horizontal, straight, pointed, from three to four inches long, and about as thick as a goose-quill. *Seeds* ten or twelve, cylindric, truncated at both ends, dark brown, with lighter coloured spikes.

11. P. *Mungo. Willd.* iii. 1036.

Annual, sub-erect, ramous, the whole plant hairy. *Leaflets* cordate. *Stipules* ovate-oblong. *Legumes* horizontal, cylindrical, hairy. *Seeds* from eight to twelve, green.

P. *hirtus. Retz. Obs. f.* iii. *N.* 76.

*Sans.* Moodga.

*Engl.* Green gram.

*Hind.* Walli mung.

*Beng.* Moog.

*Teling.* Patcha-pessara the name of the plant; and Patcha-pessaloo of the grain.

This is one of the sorts of dry grain of the leguminous kind, which is much cultivated all over India during the cold season. I never saw it wild.

*Stem* annual, erect, ramous, generally about two feet high, angular, very hairy, as is every part of the plant. *Leaves* terminal. *Leaflets* slightly acute, the lateral ones obliquely

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cordate, the terminal one rhomb-cordate. *Petioles* often as long as the leaflets, channelled. *Stipules* of the petioles adjoining, ovate-cordate, pointed at both ends, ciliate; those of the leaflets narrow-lanced, ending in a bristle. *Peduncles* axillary or terminal, when terminal they are often, in luxuriant plants compound, erect, round, shorter than the petioles, ending in an enlarged, cylindric, glandular, flower-bearing head. *Bractes* one to each pedicel, and two pressing on the calyx, they are all lanceolate, concave and falling. *Flowers* numerous, sub-sessile, pretty large, of a dirty greenish yellow. *Calyx* pretty smooth; upper segment broad, emarginate, the under one twice as large, and pointed. *Banner* broad, emarginate. *Wings*, the right one, when the flower is held from the person looking at it, and the calyx towards him, is with the keel twisted to the left. *Keel* on the left side, when the flower is held as above; there is a horn near the base, as in *Indigofera*, but here it is on one side only. *Legumes* cylindric, spreading, about two inches and a half long, very hairy, pointed. *Seeds* small, from ten to fifteen, sub-cylindric, separated by thin membranaceous partitions.

There are a great variety of plants; *culmiferous* and *leguminous*, cultivated over India, under the general name of dry, or small grain, because they require very little water, at least much less than rice, which is called the great crop. Why we also call them small grain, I cannot say, unless it is because the quantity cultivated is small, in proportion to that of rice. When the usual rains fail, which is too often the case, famine is generally the consequence; for, as rice is a water plant, it requires to be constantly flooded to make it productive. In the Northern Circars, the present year is the second, a most uncommon event, in which the periodical rains have almost entirely failed; not more than one fourth the usual quantity having fallen, viz. about fifteen inches each year instead of sixty. It is during such times that these different sorts of dry or small grains become the most serious objects of their farmer's attention, for on them depend the lives of thousands.

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This plant is a considerable subject of the Indian farmer's culture. It requires a strong, rich, dry soil. During the rains it is sometimes cultivated on high lands, that do not retain water long; but the greatest quantity is raised during the cold season, on rice lands. Immediately after the rice is cut, the ground is watered, if there is no rain, from a river or some adjacent tank, then slightly ploughed, and while moist the grain is sown, and harrowed in by dragging some bushes over it. The natives have no other harrow, although I have made one and often caused it to be used before them to harrow in Indigo seeds, yet though fully satisfied of its superior value to any thing they had any idea of, not one will follow the example. But to return to P. *Mungo*; it requires no further care; the dews which are copious at this season, furnish all the moisture it requires. In from seventy-five to ninety days, it is ready to cut. In a good soil, and with a favourable season, it yields about thirty fold. The ripe grain is well tasted, is esteemed wholesome, and affords much alimentary matter, of course it is high priced, being nearly as dear as rice, and is much used in food by the natives.

Cattle do not like the straw; beside it is reckoned very unwholesome for them, on account of the great quantity of stiff hairs, which cover every part of the plant.

In India we have many plants of this class, that cattle will not eat; whereas in Europe they are all greedily sought after, and esteemed the richest food for them. Many of them are there extensively cultivated for that purpose; here I know of none, nor indeed any vegetable whatever, that the natives cultivate for their cattle, except the straw of the plants cultivated for the food of man, they trust entirely to bountiful Nature. In consequence of so much neglect, the poor animals suffer exceedingly during the hot season, when vegetation, except in large trees, is almost entirely at a stand, and the surface of the earth truly clad in *russet gray*. The plants of this class, like the *papilionaceæ* in Europe, improve the land on which they are raised; whereas the culmiferous, rice excepted,

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weaken it. The native farmers are perfectly sensible of this important fact; from them it is more than likely that the western parts of the old world first learned the art of changing their crops.

12. P. *Max. Willd.* iii. 1036.

Annual, sub-erect, every part very hairy. *Leaflets* cordate. *Stipules* lanceolar. *Legumes* ascending, hairy. *Seeds* from six to twelve, black.

Katu ulinu. *Rheed. Mal.* viii. *t.* 50.

*Beng.* Krishna moog.

I doubt if this be any thing more than a variety of P. *Mungo*, or *Mungo* of this. Nella-pessara is the Telinga name of the plant, and Nella-pessaloo of the grain.

*Beng.* Kala-moog.

*Hind.* Kali-mung.

*Engl.* Black Gram.

This, like the former, I have only found in a cultivated state. It differs from it only in being more ramous, and if possible more hairy, in having the stem and branches darker coloured, and often clouded with still darker coloured spots. The colour of the seeds is the only specific mark, if so trifling a distinction can be so called. It is constant, and so far as I have learned no change of soil, situation &c. alters it.

This is less cultivated than Moog, the grain being somewhat less esteemed, and of less value, the same soil suits it, and it is frequently mixed and sown with other sorts of grain, viz. *Holcus saccharatus*, and *Holcus sorgum*, *Linn.* These culmiferous plants rise high and shade the black pessaloo while it occupies the surface of the ground, keeping it cooler and moister than it would be without it. It is sown earlier than the green pessaloo, generally just before the close of the rains, because it likes moisture more than the other, requires about the same length of time to ripen, and yields nearly the same produce.

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13. P. *radiatus. Willd.* iii. 1036.

Annual, diffuse, hairy. *Leaflets* elliptic. *Stipules* lanceolate. *Horn* of the keel very long. *Legumes* cylindric, straight, hairy. *Seeds* from four to six, black, with gray spots.

*Beng.* Mash-Kulay; in some provinces of Hindoosthan it is called Dord.

Tekeree, is a small black-seeded variety.

*Sans.* Masha.

*Teling.* Minoomoo the name of the plant, and minoomooloo the grain.

This like the former two I have found only in a cultivated state; it is also annual.

*Stem* scarcely any. *Branches* many, from one to three feet long, procumbent, winding, somewhat angular and a little twisted; it is less hairy than the former two species, and the hairs less harsh. *Leaves* alternate, ternate. *Leaflets* nearly equal, oblong, pointed, slightly scolloped, both sides hairy, three or four inches long and one and a half, or two broad. *Petioles* longer than the leaflets, channelled, hairy. *Stipules* of the petioles adjoined, oblong, pointed at both ends; those of the leaflets narrow-lanceolate, ending in a bristle. *Peduncles* axillary, erect, shorter than the petioles, hairy; the apex surrounded with many flower-bearing glandular tuberosities. *Bractes* as in the former. *Flowers* from four to eight in each peduncle, middle-sized, yellow. *Calyx* pretty smooth. *Banner*, opposite to the horn of the keel is a pit, which receives the horn till the flower opens. *Keel*, the horn mentioned in the former two is here remarkably large. *Legumes* nearly erect, straight, cylindric, acute, two inches long, very hairy. *Seeds* small, from four to six, black, with gray spots.

This sort is the most esteemed of all the *Leguminæ*, and bears the highest price. Of the meal they make bread for many of their religious ceremonies. It requires a similar soil to green and black pessaloo, and is generally sown about the latter part of the rains in November, either alone or mixed

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with the seeds of the same culmiferous plants. Like black *pessaloo*, it thrives the better by having a few showers after it is sown. Its produce is also about thirty-fold.

Cattle eat the straw of this, and it is reckoned very nourishing for them.

13. P. *aureus. Roxb.*

Annual, diffuse, round, hairy. *Leaflets* semi-cordate, exterior rhomboidal. *Horn* of the keel large, obtuse. *Legumes* cylindric, straight, pendulous, hairy, torulose, with eight or ten oval yellow seeds.

*Beng.* Sona Moog.

I have only found this plant in its cultivated state in Bengal. I believe it is unknown to the Coromandel coast. Seed-time the close of the rains, in October or November. The harvest is in February, when the plants perish.

*Root* nearly simple, perpendicular. *Stem* very short, but several spreading branches rest close on the ground, they are from one to two feet long, round and hairy. *Leaves* long-petioled, ternate. *Leaflets*, the pair semi-cordate, or nearly so, the exterior one rhomboidal, all are entire, and a little hairy on both sides, from two to three inches long, and from one and a half to two broad. *Petioles* as long as the leaflets, channelled, hairy. *Stipules* of the petiole adjoined, oblong, those of the leaflets narrow lanceolate. *Peduncles* axillary, solitary, in a rich soil often proliferous, by the time the seeds are ripe they are about as long as the petioles. *Flowers* many, short-pedicelled, of a greenish yellow, livid on the outside, brighter within. *Bractes* three-fold, one-flowered, one under the pedicel, and two pressing the calyx laterally, they are all boat-shaped, acute and hairy. *Calyx* four-cleft, the upper division broad, and emarginate. *Corol* as in the other species with the horn of the carina large, and obtuse. *Legumes* reflexed, straight, acute, cylindric, torulose, as thick as a quill, about two and a half inches long, black and hairy. *Seeds* from six to twelve, small, smooth and yellow.



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The seeds form an article of the diet of the natives; and are to be found in every bazar. The general price in Calcutta, is about two rupees and a half for a maund of eighty-four pounds weight.

14. P. *torosus. Roxb.*

Annual, rigid, erect, almost branchless, villous. *Leaflets* oval. *Racemes* axillary, one, two or more together; sub-sessile, much shorter than the petioles. *Legumes* cylindric, drooping, torose, smooth, longer than the raceme, from six to ten-seeded. *Seed* oval, white.

Seeta Maas of the Newars.

One of the cultivated legumes of Nepal; from thence Dr. Buchanan sent the seeds to the Botanic garden in 1802, where they produced a luxuriant crop during the cold season of 1802—3.

*Root* annual. *Stem* erect, often simple, or with an erect, downy branch or two, height of the whole plant, when reared during the cold season, from one to two feet. *Leaves* oblong, petioled, ternate. *Leaflets* ovate-cordate, entire, a little downy. *Stipules* adjoined, rather smaller than most of the other species of this genus; those of the leaflets, lanceolate. *Racemes* axillary, numerous, often several from the same axill, much shorter than the peduncle, lengthening a little as the seeds advance to maturity. *Flowers* numerous, though rarely more than one on the same raceme, expanding at the same time, of a pale sulphur colour; they expand late in the day, and soon shut and remain concealed amongst numerous scariose bractes. *Calyx, divisions* five and nearly equal. *Horn* of the carina small. *Legumes* reflexed, cylindric, torose, smooth, from six to ten-seeded, and longer than the whole of the raceme. *Seeds* short, sub-cylindric, smooth, of a pale cream colour.

15. P. *trilobus. Willd.* iii. 1035.

Herbaceous, procumbent. *Leaflets* three-lobed. *Lobes*

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oval. *Stipules* ovate-lanceolate. *Peduncles* longer than the leaves, few-flowered. *Legumes* cylindric, smooth, six-seeded.

Dolichos *trilobus. Burm. Ind. t.* 50. *f.* 1.

Glycine *triloba. Willd.* iii. 1056.

Trifolium madraspatense. *Pluck. Alm. t.* 120. *f.* 7. good.

*Hind.* Rakhal-kuluy.

*Teling.* Pelli pessara.

This species I have never found but in its wild state. It grows on the banks of water courses, borders of rice fields, and in moist cultivated spots. Flowering time most part of the year.

*Root* sometimes perennial. *Stems* annual, many, diffuse, sometimes rooting at the joints, never twining, round, sometimes hairy, sometimes smooth, from one to four feet long. *Leaves* ternate. *Leaflets* equal, varying much in form, but generally three-lobed, sometimes smooth, sometimes hairy, according to the soil, about an inch each way. *Petioles* longer than the leaflets, erect, channelled. *Stipules* of the petioles ovate, adjoined; of the leaflets small, oval. *Peduncles* axillary, very long, often two feet, ascending, hairy, headed as in the other species. *Flowers* small, yellow, from four to eight composing the head. *Legumes* as in the last, but smooth. *Seeds* gray.

The seeds are gathered and eaten by the poor, being reckoned equally wholesome as the cultivated sorts and are as palatable, but the plant produces so little, that it is not worth the farmer's while to cultivate it. It is no doubt what Dr. König considered *P. aconitifolius.* Cattle eat it greedily.

16. P. *aconitifolius. Willd.* iii. 1034.

Annual, diffuse. *Leaflets* from three to five-lobed; *lobes* linear lanceolate. *Head* long, peduncled, many-flowered. *Legumes* horizontal, cylindric, smooth.

*Hind.* Moot.

This plant I have reared from seed sent me by Dr. Hunter



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from the province of Oude where it is much cultivated, as it also is over the adjoining provinces to the westward, and used for feeding cattle; seed-time there, June and July; harvest in November.

*Root* annual, perpendicular, with few fibres. *Stems* numerous, spreading close in the ground, and extending from two to twelve feet every way; succulent, angular and a little hairy. *Leaves* ternate. *Leaflets* deeply divided into three, or five, linear-lanceolate, somewhat hairy, entire lobes. *Petioles* longer than the leaflets, deeply channelled above, with ridges underneath. *Stipules* of the petioles adjoined, ovate-lanceolate; those of the leaflets subulate. *Peduncles* axillary, solitary, nearly as long as the petiole, but much more slender, angular and somewhat hairy, each ending in an oblong glandular head, of many small, yellow, short-pedicelled flowers. *Bractes* lanceolate, ciliate. *Calyx; corol*, &c. as the genus. *Legume* horizontal, cylindric, pretty smooth.

The uncommon luxuriance of this plant gives reason to think it will yield a much larger crop of fodder than any other I am acquainted with.

## *DOLICHOS. Schreb. gen. N.* 1181.

Two callosities at the base of the banner, parallel, oblong, compressing the wings underneath.

1. D. *gladiatus. Willd.* iii. 1039.

Perennial, twining, smooth. *Leaflets* ovate-cordate, rather acute. *Legumes* gladiate, three-keeled, or two-grooved on the back, the middle one three-ribbed. *Seeds* arilled, red, white, or gray.

*Beng.* Mukhun-shim.

D. *ensiformis. Syst. Veg.* 547. *Kæmp. tab.* 39.

Bara mareca. *Rheed. Mal.* viii. *t.* 44.

Lobus machæroides. *Rumph. Amb.* v. *t.* 135. *f.* 1.

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Phaseolus *maximus. Sloan. Jam. p.* 177. *t.* 114. *f.* 1. 2. 3. good.

There are two varieties of this cultivated in Bengal, one with white, the other with red flowers; both have red beans. The young, tender, half-grown pods of both are good substitutes for those of the common *Phaseolus*, commonly called French beans. From Pegu a third variety has been received into the Botanic garden, which differs from the former two in the following respects, viz.

In the legume being rather straighter, and the seeds light gray, instead of red, but the flowers are red. The same variety has also been found in the Silhet district, together with a fourth which is every way larger; the flowers white, the legumes truly gladiate, about two feet long, and often containing as many as twenty large, white, arilled seeds. This variety is reckoned the most wholesome of them all, and is very extensively used at the tables of Europeans, as well as by the natives in that district.

2. D. *Virosus. Roxb.*

Biennial, twining, smooth. *Leaflets* oval. *Stipules* short, subulate. *Racemes* sub-secund. *Legumes* three-keeled on the back; seeds from four to eight, arilled.

Katu-Barameraca. *Rheed. Mal.* viii. *t.* 45.

D. *ensiformis. Lour. Cochin Ch.* 531. His long-legumed variety is most likely one of the varieties of D. *gladiatus.*

*Beng.* Kath-shim, or Kala-shim.

*Teling.* Aduvi-shamba.

A native of hedges, &c. in most parts of India, and in flower and fruit a great part of the year.

*Stems* may be reckoned biennial, twining to the extent of several fathoms, round, and smooth in every part. *Leaves* ternate. *Leaflets* nearly equal, oval, scarcely pointed, entire and smooth, from two to three inches long. *Petioles* about as long as the leaflets, channelled. *Stipules* short, like short inoffensive thorns; those of the leaflets subulate. *Race-*

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*mes* axillary, solitary, as long, or longer than the leaves, subsecund. *Flowers* in pairs, on round glands, scattered over the exterior half of the rachis, large, of a beautiful rosy purple. *Calyx* bilabiate; *upper lip* of two broad, circular lobes; the under one three-toothed and small. *Banner* erect, roundish, emarginate. *Wings* and *keel* falcate. *Style* and *stigma* smooth. *Legumes* linear, scimitar-shaped, smooth, from four to six inches long. Hard, tough, with the upper margin three-keeled, or two-groved, as in D. *gladiatus* and *rotundifolius*. *Seeds* from four to eight, oblong, considerably larger than a field bean, smooth, light gray; each enveloped in a white, tough, membranaceous aril.

I do not find that any part of this species is in any shape useful to the natives, or others; indeed the natives of Coromandel, where the plant is common, reckon it poisonous, which is corroborated by Van Rheed.

3. D. *rotundifolius. Vahl. Symb.* ii. *p.* 81. *Willd.* iii. 1040.

Biennial, twining, smooth; *leaflets* obovate, rotund. *Legumes* semi-elliptic, from three to four inches long. *Bark* three-keeled. *Seeds* from three to five, obovate, gray, in a common membranaceous aril.

Katu-Tsjandi. *Rheed. Mal.* viii. *t.* 43, which is also quoted by Lamarck for his D. *obtusifolius. Encycl.* ii. 295.

A native of the Islands about the mouth of the river Godaveri, &c. on the coast of Coromandel. Flowering time the rainy season.

4. D. *sinensis. Willd.* iii. 1038.

Annual, twining, smooth. *Peduncles* longer than the leaves, many-flowered. *Legumes* long, pendulous, cylindric, torose.

*Hind.* Lobia.

*Teling.* Alsanda.

*New.* Haco-bhati.

D. *sinensis. Rumph. Amb.* v. *t.* 134.

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D. *sesquipedalis. Willd.* iii. 1040.

Of this we have two varieties, one with white, and the other with brown seed. The first is most esteemed for the table. Seeds of the second were sent to me by Dr. Klien, and Dr. Rottler of Tranquebar, two good Botanists, under the name of *Dolichos Tranquebariensis. Willd.* iii. 1039.

5. D. *obcordatus. R.*

Perennial, twining, smooth. *Leaflets* obcordate, emarginate. *Racemes* erect. *Legumes* linear-oblong, straight, three-keeled, or two-grooved in the upper margin, dagger-pointed, from five to six-seeded. *Seeds* dark brown.

From Canton in China the seeds of this very beautiful odoriferous species, for so its red violet flowers are during the forenoon, were received into the Botanic garden at Calcutta, where the plant blossoms during the rains and the seed ripens in the cold season. It is most evidently allied to *gladiatus, virosus,* and *rotundifolius,* but differs most conspicuously from all in the shape of the leaves.

6. D. *Catjang. Willd.* iii. 1051.

Annual, twining. *Leaflets* sub-deltoid, angular behind. *Peduncles* few-flowered. *Legumes* sub-cylindric, erect.

Paeru. *Rheed. Mal.* viii. *t.* 41. is broader-leaved than any I have met with.

*Teling.* Bobra, the name of the plant. Boberloo the seed or pulse.

*Beng.* Burbuti.

*Phaseolus erectus, &c. Sloan. Jam. t.* 117. is very like our plant.

Kurson pyro, the Canara name of the black-seeded variety.

Three or more varieties of this useful species are found cultivated in the fields in many parts of India, during the dry season, viz. from October until February.

*Stem* always twining, except in a very poor soil, round, but rather harsh to the feel; extent various according to the

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soil, and season. *Leaves* ternate. *Leaflets* between deltoid-parabolic, and hastate, angular behind, rather obtuse; smooth on both sides, from two to three inches long. *Petioles* nearly as long as the leaflets, deeply channelled. *Stipules* of the petioles adnate, ovate, acute at both ends; those of the leaflets roundish. *Peduncles* axillary, solitary, from two to eight or twelve inches long, bearing a few, large, bluish flowers on a short, glandular head. *Calyx* campanulate. *Segments* subulate. *Banner* large, nearly round, of a pale blue on the inside, and greenish yellow on the back. *Callosities* keeled, and yellowish. *Wings* blue, semilunar. *Keel* nearly white. *Filaments* beyond their tube long, fine and inclined to twist. *Anthers* minute. *Style*, the exterior half much bearded on the inside. *Legumes* nearly straight, erect, cylindric, smooth, as thick as a large quill; *apex* more or less recurved and concave behind. *Seeds* from six to twelve, sub-cylindric, ends truncated, smooth, colour and size varying in the different varieties.

With Dr. König, I was long inclined to consider this a variety of D. *Sinensis* and as such transmitted to the Honourble the Court of Directors a short description of the plant, without any drawing; but more experience induces me to consider them distinct on account of the shape of the leaves, independent of the great difference in their size. This is the description of the variety most generally cultivated on the Coromandel coast.

A rich friable soil suits these plants best. On the Peninsula the seed is sown in October, immediately after the rains, and the crop gathered in February; it produces in a good soil, about forty fold. The grains, or pulse is low priced, generally eaten by the poorer classes, and the straw is given to the cattle.

The variety with smaller black seeds which is more slender, and the leaves narrower, is considered by Dr. Klien of Tranquebar a distinct species, the seed of which he sent me under the name *Dolichos capitatus.*

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7. D. *tetragonolobus. Willd.* iii. 1040.

Annual, twining, smooth. *Legumes* pendulous, with four membranaceous lacerated angles.

Lobus quadrangularis. *Rumph. Amb.* v. *t.* 133.

Reared in gardens for the table. Where indigenous I cannot say; like by far the greater part of the genus they thrive best during the cool time of the year, viz. from October to March. We have an herbaceous variety from Pegu, with tuberous esculent roots.

8. D. *lablab. Willd.* iii. 1037.

Perennial, or annual, twining, generally smooth. *Racemes* erect with alternate facicles of short pedicelled flowers on glandular knobs. *Legumes* horizontal, compressed, semilunar, with a straight scabrous back, ending in a straight-daggered point. *Seeds* from three to five, with a larger edge on the exterior margin.

Of this species there are known to me five varieties in a cultivated state, and two wild. A short description of what I reckon the first variety, viz. Annapa of the Telingas, will serve for the other six.

1*st. Teling.* Annapa.

*Stem* for about a foot erect, thin, with its branches twining, and running to a considerable extent if supported; round, smooth. *Leaves, stipules,* and *racemes* as in D. *lignosus. Legumes* horizontal, semilunar, compressed, with the margins rugose, and the apex straight, subulate. *Seeds* from three to four.

The whole of this plant has a heavy disagreeable smell, something like the green bug, *(Cimex viridulus.)* It is much cultivated in the fields during the cold season, and delights in a rich, black soil, which cannot be flooded by rains. Like *Bobra,* it requires three months from the sowing, till ripe; yields in a good soil, about forty fold. These seeds bear a low price, compared to most other sorts of grain. They are much eaten by the poorer classes, particularly when rice is dear.



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They are not palatable, but reckoned wholesome substantial food.

Cattle are also fed with the seeds, and they are remarkably fond of the straw. It is said to make cows yield much milk. The other six varieties are :—

2*d. Teling.* Annapa chikurkai.

*Cacara* alba. *Rumph. Amb.* v. *t.* 137.

Dolichos *albus. Lour. Cochin Ch.* 534.

D. *Bengalensis. Linn. Syst.* 657.

Cultivated in gardens and supported by poles or pendals, often forming arbours about the doors of the poor natives. Differs from the first variety, *(Annapa)* in being a little downy, with the legumes a little inclined to a curved, wedge shape, and is void of the disagreeable smell of *Annapa.* The tender legumes of this, and the three following varieties are much used by the natives in curries; the ripe seed is never eaten.

3*d. Beng.* Geea-shim.

Cacara, sive Phaseolus perennus. *Rumph. Amb. t.* 136.

This is larger than any of the former, is tinged with red. *Peduncles* short, with red flowers. Is also cultivated like the last, and much esteemed by the Hindoos.

4*th. Beng.* Goordal-shim.

Is a still larger variety with purple flowers in nearly sessile heads. *Legumes* broader, with the seeds more remote than in any of the other varieties. Is also cultivated here in the same manner as the two last.

5*th.* Dolichos *purpureus. Lour. Cochin Ch.* 534. *Willd.* iii. *p.* 1084.

D. *lablab. Bot. Mag.* 896.

I cannot consider this as any thing more than a variety of *lablab*, differing in colour only; the whole plant being deeply tinged with red, the flower is deep red, and the legumes of a bright reddish purple. It is rare in Bengal. The seeds of all the cultivated varieties are sown about the close of the rains, and produce their crop during the cold season.

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6*th. Beng.* Bun-shim.

*Teling.* Adavi chikurkai.

Dolichos spicatus. *Kön. Mss.*

Cacara litorea. *Rumph. Amb.* v. *t.* 141. *f.* 1.

Smooth in every part, and frequently biennial if not perennial. It is never cultivated, nor any part of it used.

7*th.* For the seventh variety I have no Asiatic name. It is found with the former wild in the hedges, &c. near Samulkota, and differs from it in being very downy; both have red flowers and dark gray, mottled seeds. No part of these two varieties is made any use of.

9. D. *lignosus. Willd.* iii. 1049.

Perennial, twining, smooth. *Racemes* erect, long with alternate fascicles of short pedicelled flowers, on glandular knobs. *Legumes* linear, oblong, slightly incurved, torulose, both margins turned and rugose, with a subulate, recurved apex. *Seeds* about four.

I include under the above definition many varieties, some of them hitherto deemed distinct species. All are cultivated during the cold season in the gardens and about the doors of the natives; forming not only cool, shady arbours, but furnishing them with an excellent pulse for their curries, &c. in the tender legumes. In short these, and the four last mentioned, cultivated varieties of *lablab*, may be called the *Kidney beans of the Asiatics.*

*Var.* 1*st. Beng.* Panch-shim.

*Teling.* Tella chikurkai.

The flowers are white, the legume straighter than in some of the other varieties, and the seed reddish. I take it to be *Loureiro's* D. *unguiculatus*, but not that of Rumphius. The following full description of this variety will serve for the other five.

*Stem* biennial or triennial, although seldom allowed to remain more than one year, twining, the lower parts becoming woody, and as thick as the thumb, round, smooth, running to



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an extent of many feet, or even fathoms, when supported. *Leaves* ternate. *Leaflets* broad cordate, smooth, entire, nearly equal, from three or four inches long, and nearly the same breadth. *Stipules* of the petioles cordate, pointed, reflexed, those of the leaflets semi-lanceolate. *Racemes* axillary, rigidly erect, longer than the leaves, sometimes leaf-bearing. *Flowers* large, pure white, collected on remote, glandular globular tuberosities. *Bractes* one to the insertion of each pedicel, and two pressing the calyx laterally. *Banner*, its callosities are remarkably large. *Nectarial cup* as in D. *gladiatus*. *Legumes* horizontal, somewhat scimitar-shaped, protuberant, somewhat inflated, while green both margins very rugose, with a subulate apex, recurved, about as thick and long as the little finger. *Seeds* about four, oval; *hilum* large, bending round the upper extremity.

*Var.* 2*d.* Bagha-nakhooa (Tiger's claw) shim. *Peduncles* short. *Flowers* white. *Legumes* falcate, size of the little finger.

*Var.* 3*d.* Sada-Jamai-kooli-shim. *Peduncles* short. *Flowers* white. *Legume* of a pretty straight gladiate-clavate shape, and about the length of the little finger.

D. *cultratus*. *Willd.* iii. *p.* 1039. and *B. H. Banks' Icon. t.* 25.

*Var.* 4*th.* Pituli-jamai-pooli-shim of the Bengalees. *Peduncles* short. *Flowers* reddish purple, differing in this respect only from last, for the legumes are the same.

*Var.* 5*th.* Doodha-pituli-shim. *Large peduncles* pretty long. *Flowers* purple. *Legumes* falcate, and much longer than in Bagha-nakhooa.

*Var.* 6*th.* Ganchi-shim of the Bengalees.

Nella chikurkai of the Telingas. The largest of all. *Peduncles* long. *Flowers* red. *Legumes* from six to eight inches long, much curved. *Seeds* black, with a white eye.

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10. D. *bulbosus. Willd.* iii. 1046.

*Root* tuberous. *Stem* twining. *Leaflets* villous, with their exterior margins sinuate dentate.

Cacara bulbosa. *Rumph. Amb.* v. *t.* 132. *f.* 2. bad.

On the continent of India this plant is an exotic, and has been introduced from the Malay Islands. Probably first from South America to the Philippine Islands, a route by which several plants have found their way from the new world, to the eastern parts of Asia, and from thence the useful kinds soon find their way to the westward. See Rumphius's account of the plant, at page 373 of the 5th volume of his *Herbarium Amboinense.*

*Root* tuberous, not in bundles but single, varying much in shape, and with high culture, growing to a very great size; *outside* white, *inside* much like that of a turnip. *Stem* ramous, sometimes perennial, twining to a great extent. *Young parts* tolerably well clothed with reflexed soft hairs. *Leaves* ternate. *Leaflets*, the pair nearly triangular, the interior one of a rhomb-reniform shape; in all, the interior margins are serrate-dentate, and somewhat villous on both sides; *size* various, the largest often six inches each way. *Petioles* channelled. *Stipules* of the petioles ensiform,* those of the leaflets filiform. *Racemes* axillary, from one to two feet long, sub-erect, bearing numerous fascicles, of large, short, pedicelled, beautiful, violet blue flowers inserted on large glandular knobs. *Bractes* of both pedicel and calyx small, and caducous. *Calyx* four-parted, the upper lip, or division, broad, emarginate. *Vexillum* sub-rotund; *wings* semilunate, with a long filiform projection at the base. *Filaments* alternately shorter. *Germ* with a crenulate nectarial ring round the base; *apex* of the style spirally incurved, almost as in the *Phaseoli.* *Stigma* large. *Legume* linear, straight, compressed, laterally contracted between the seeds, of a dark blackish brown colour;

* Can Loureiro's plant be the same? he says his is without stipules, and here they are pretty large, and conspicuous.

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clothed with a few, short, white, compressed hairs. *Seeds* from eight to twelve, nearly circular, but much flattened, brown, and smooth.

It is cultivated throughout the Malay Islands for its roots, which resemble a turnip in taste, and consistence, and form part of their diet, no other part of the plant is eaten.

11. D. *gangeticus. Roxb.*

Biennial or perennial, twining, smooth. *Leaflets* lanceolate. *Peduncles* longer than the leaves, many-flowered. *Legumes* cylindric, reflexed, from six to eight-seeded.

*Beng.* Bun burbutee.

Found on the moist banks of the Ganges, where it flourishes during the cold season, and lasts at least two years.

*Stems* twining to a considerable extent, smooth. *Leaflets* ovate-lanceolate, sub-equal, entire, and pretty smooth, three inches long, by about one broad. *Petioles* channelled. *Stipules* small, adjoined, cordate. *Peduncles* axillary, solitary, erect, round, smooth, much longer than the leaves, each supporting a head of from four to eight large, yellow, short-pedicelled flowers. *Wings*, a remarkable long horn projects forward from near the base into the concavity formed by the calluses of the base of the banner. *Legumes* reflexed, cylindric, with a recurved conical point, a little curved, and with a few short, stiff hairs, which are readily removed by friction. *Seeds* six or eight, sub-cylindric, dark brown, size of a small pea. Cattle are fond of it, otherwise it is of no use that I can learn.

12. D. *prostratus. B. H.* and *Kön. Mss.*

*Root* tuberous. *Stems* twining, downy, herbaceous. *Leaflets* oval, silky underneath. *Racemes* shorter than the leaves. *Legumes* scimitar-shaped, three or four-seeded.

D. *ciliatus. Willd.* iii. 1049.

*Teling.* Canchi chikurkai.

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An herbaceous species, common in hedges near the sea. Flowers during the cold season.

*Root* perennial, tuberous. *Stems* annual, twining, round, downy, branchy, from six to twelve feet long. *Leaves* ternate. *Leaflets* equal, oval, entire, margin and under side covered with much, silver-coloured hair, about two inches long, and one and a half broad. *Petioles* hairy, channelled. *Stipules* of the petioles cordate pointed; those of the leaflets lanceolate. *Racemes* axillary, generally shorter than the leaves, few-flowered. *Flowers* pretty large, sulphur-coloured. *Stigma* cordate, smooth. *Legumes* horizontal, scimitar-formed, smooth, from three to four-seeded.

13. D. *falcatus. Willd.* iii. 1047.

*Root* tuberous. *Stems* twining, smooth. *Leaflets* somewhat three-lobed, smooth. *Racemes* short, few-flowered; *Legumes* linear.

Phaseolus Madraspatensis. *Pluk. t.* 214. *f.* 3.

Glycine *triloba.* B. H. (i. e. *Sir J. Banks' herbarium.*)

D. *trilobus. Lour. Cochin Ch.* 535.

*Teling.* Itoo mungee tiga.

It is common in hedges, thickets, &c. where the soil is rich and moist. Flowers during the cold season.

*Root* perennial, tuberous, as thick as the thumb, or more. *Stems* herbaceous, from four to five feet long, twining, slender. *Leaves* ternate. *Leaflets* nearly equal, the lateral ones gibbous outwardly, the terminal one smooth on both sides, of a paler green or whitish in the centre, about an inch and a half each way. *Stipules* of the petioles oblong, pointed, reflexed; those of the leaflets subulate. *Peduncles* axillary, slender, from four to eight-flowered, umbel-like, bowing from the weight of the flowers. *Flowers* large, of a beautiful bluish purple. *Legumes* linear, compressed, smooth, from four to eight-seeded.

The tuberous roots are cut by the natives into the form of

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beads, and strung and worn round the neck to cure purging in children.

14. D. *glutinosus. Roxb.*

Annual, twining, the whole plant glutinous. *Racemes* longer than the leaves, with single, alternate yellow flowers. *Legumes* lanceolate, cuspidate, two-seeded.

*Beng.* Shim-bhatraji.

*Teling.* Kar-Kandi.

A native of hedges and unfrequented places; it is by no means a common species. Flowers during the cold season.

*Stem* biennial, or perennial, from four to five feet long, twining, downy; the young shoots are particularly so, and glutinous. *Leaves* ternate. *Leaflets*, the lateral pair have their outside remarkably large, and the inside lanceolate, the terminal one broad-rhombed, all are acute and covered with glutinous down. *Stipules* of the petioles cordate, spreading; those of the leaflets subulate. *Racemes* axillary, peduncled, longer than the leaves, erect, many-flowered. *Bractes* of the pedicel single, oval, concave, one-flowered, caducous. *Flowers* pretty large, yellow. *Banner* obcordate; the callosities are remarkably large. *Legumes* reflexed, a little lanceolate, protuberant, five-pointed, covered with much glutinous hair, two-seeded. *Seeds* kidney-form, shining, smooth, gray.

I know of no use to which this is put. Cattle do not eat it.

15. D. *pilosus. Willd.* iii. 1043.

Perennial, twining, very hairy. *Flowers* on short axillary racemes. *Wings* two horned. *Legumes* cylindric, pointed, very hairy, from eight to twelve-seeded.

*Beng.* Malkonia.

A rare annual species, found in hedges where the soil is good. Flowers during the cold season.

*Stem* perennial, twining, from three to six feet long, covered with much soft, white hair. *Leaves* ternate. *Leaflets* of the same general form of the rest of the family, but narrower.

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very downy; about four inches long and one and a half broad. *Petioles* slightly channelled. *Stipules* small, lanceolate. *Peduncles* axillary, short-headed, many-flowered. *Bractes* as in the other species. *Flowers* large, of a beautiful blue colour. *Wings* about half the length of the banner and keel, broad, irregularly angle-lobed, keeled on the under side, and on the upper and inner angle. *Legumes* pendulous, very hairy, from four to five inches long, as thick as a goose-quill, straight, cylindric, intercepted between the seeds. *Seeds* from eight to twelve, reniform, shining black. Cattle eat the straw of this plant.

16. D. *biflorus. Willd.* iii. 1051.

Annual. *Stem* erect; *branches* twining, hairy. *Leaflets* oblong, pointed. *Flowers* axillary. *Legumes* scimitar-shaped, reflexed, hairy, from five to six-seeded.

*Sans.* Koolutth*a.*

*Beng.* Koolthee.

*Teling.* Woolawa the name of the plant, and woolawaloo the grain. Horse-gram plant on the Coromandel coast.

This species I have never found but in a cultivated state. It is annual.

*Stem* very short, erect; *branches* twining; tender parts hairy, the whole plant is from two to three feet high. *Leaves* ternate. *Leaflets* broad-lanceolate, or oblong, equal, entire, downy, about an inch long, and half an inch broad. *Stipules* of the petioles oblong; of the leaflets subulate. *Flowers* axillary, small, sulphur coloured, generally each has its proper peduncle, though sometimes it is common to more flowers than one. *Bractes* lanceolate, one at the origin of each peduncle or pedicel, and two pressing the calyx laterally. *Calyx*, the upper lip slightly emarginate. *Banner* obcordate, emarginate. Wants the callous bodies. *Wings* linear. *Legumes*, direction various, scimitar-formed, compressed, about two inches long, and a quarter of an inch broad, hairy, with



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the point subulate, recurved. *Seeds* about six, compressed, kidney-formed, gray.

This species is much cultivated all over the coast. It requires a dry, light, rich soil. In October and November, it is sown, either by itself, or mixed with *Holcus saccharatus.* The general harvest time is in February. The produce about sixty-fold in a good soil, and favourable season.

Nella Woolawooloo is a most distinct variety of the above with jet black seeds. It is also cultivated.

The grain of both varieties is employed indifferently to feed cattle; however in times of scarcity the poor are glad to live upon it. In these parts it is the lowest priced of all the *leguminæ*, which enables them to procure it, when they cannot well procure any thing else. Cattle are fond of the straw of both sorts.

17. D. *Soja. Willd.* iii. 1051.

Annual, erect, flexuous, every part hairy. *Flowers* axillary, sub-racemous. *Corol* scarcely longer than the calyx. *Legume* reflexed, scimitar-shaped, from two to three-seeded.

Daidsee. *Kæmpf. amœn. p.* 837. *f.* 838. good.

Reared in the Honourable Company's Botanic garden, from seeds received from the Moluccas in 1798. It may be cultivated at all times of the year, consequently flowers at all times; but, like all the other leguminous tribe, succeeds best during the cold season.

*Root* ramous, annual. *Stem* erect, flexuous, very ramous near the base, hairy in every part; from one to four feet in height, but when high it requires support. *Leaves* long-petioled, ternate, hairy. *Leaflets* entire, ovate, the lateral ones broadest, and considerably oblique, the inferior side being much broader than the superior. *Flowers* axillary, sometimes on a common short peduncle, sometimes without it, and smaller than in any other species of *Dolichos* I have yet met with; colour a reddish purple. *Bractes* small, hairy. *Corol* scarcely longer than the segments of the calyx. *Banner*

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vaulted, emarginate and closing the wings. *Carina, stamina,* and *pistillum* as in the genus.

18. D. *medicagineus. Willd.* iii. 1044.

Biennial, twining, downy. *Leaflets* roundish. *Peduncles* from two to three-flowered. *Legumes* always seeded.

*Phaseolus exiguus. Burm. Zeyl. t.* 84. *f.* 2.

*Teling.* Gadee chikurkai.

This is a small biennial species, a native of the greater part of the coast, growing in hedges, thickets, &c. It flowers during the cold season.

*Stem* woody, slender, branchy, extending only a few feet at most, tender parts downy. *Leaves* ternate. *Leaflets* nearly equal, oval, covered with much very soft, whitish down, veined, about three quarters of an inch long, and half an inch broad. *Stipules* of the petioles cordate, pointed; of the leaflets very minute. *Peduncles* axillary, short, generally two-flowered. *Flowers* small, yellow. *Calyx*, the upper part entire. *Banner*, the callosities are very sharp, and point directly downwards. *Filaments* alternately larger. *Legume* linear, compressed, downy, protuberent at the seeds, contracted and intercepted between them. *Seeds* from four to six; *hilum* remarkably large. Cattle eat it.

19. D. *scarabæoides. Willd.* iii. 1046.

Biennial, twining, downy. *Leaflets* oval. *Peduncles* two-flowered. *Legume* falcate, from four to five seeded.

*Phaseolus minimus. Pluk. Alm. t.* 52. *f.* 3. good.

*Beng.* Banur-kuluy.

This like the last species, is biennial, a native of the same parts, and has much the same appearance, but is considerably smaller.

*Leaves* ternate. *Leaflets* nearly equal, orbicular, bullate, downy; about three eighths, or half an inch each way. *Stipules* of the petioles half-lanceolate, those of the leaflets minute. *Racemes* axillary, longer than the leaves, few-flowered.



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*Bractes* solitary, lanceolate, concave. *Flowers* yellow, small. *Legume* compressed, falcate, two-seeded. Cattle eat this sort, I know of no other use it is put to.

20. D. *Phaseoloides. Roxb.*

Perennial, twining, clothed with diverging hairs. *Leaflets* semi-cordate, and deltoid, or three-lobed. *Racemes* the length of the leaves. *Legumes* cylindric, toward the apex incurved, from ten to twenty-seeded.

From Mr. Kerr at Canton in China, the seeds were received into the Botanic garden in 1804; where the plants thrive well, and blossom chiefly about the close of the rains, and the seeds ripen about the beginning of the cool season.

*Stem* and *branches* perennial, twining, when they do not meet with support, they run on the ground, and strike root, round, and clothed with distinct, brown, diverging hairs. *Leaflets* the pair sub-semi-cordate, sometimes the posterior margin projects into a large rounded lobe, the terminal one deltoid, or three-lobed, all are hairy like the branches, generally from two to three inches long, and from one to two broad. *Petioles* very hairy, hairs harsh, and brown. *Stipules* of the petioles triangular, of the leaflets subulate. *Racemes* axillary, solitary, about as long as the leaves. *Flowers* numerous, pretty large, violet-coloured, and collected in bundles on alternate glands. *Bractes* of the gland three-fold, those of the flowers two-fold, all are very hairy, and ovate-lanceolate, the former caducous, the latter more permanent. *Calyx* somewhat bilabiate, the flower three-toothed, the middle tooth ends in a long filiform point, the upper bidentate. *Legumes* diverging, cylindric, towards the apex incurved, about as thick as a common quill, and from three to four inches long, black when ripe, and a little hairy. *Seeds* from twelve to twenty, smooth, small, brownish gray.

21. D. *fabæformis. Willd.* iii. 1052.

Annual, erect. *Leaflets* ovate, dentate. *Stipules* subu-

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late. *Racemes* axillary. *Legumes* straight, acute, three-keeled on the back, from ten to twelve-seeded.

D. *psoraloides. Lamarck. Encycl.* ii. 297.

*Teling.* Goor-chikurkai.

Psoralia *tetragonoloba. Mant.* 104. *Rich.* iii. 544.

Is an annual esculent plant, much cultivated in the gardens of the natives on the coast of Coromandel. I never saw it wild.

*Stem* annual, erect, branchy, irregularly angular from the insertion of the leaves, a little hairy, piped, about as thick as the little finger and about three feet high. *Leaves* alternate, ternate. *Leaflets* oval, acute, grossly serrate, on both sides are a few procumbent white hairs, with the under side slightly scabrous, from two to three inches long, and from one to two broad. *Petioles* three-sided, channelled. *Stipules* subulate. *Racemes* axillary, single, about as long as the petioles, many-flowered. *Flowers* rose-coloured, small, very short-pedicelled. *Bractes* single, each pedicel subulate. *Calyx*, under divisions largest. *Corol*, when it first opens, soon after sun-rise, it has the general form of other papilionaceous flowers, but about ten o'clock they expand and appear angular, and four-petalled; the least touch hastens the change, and the petals fly open with a very smart elastic jerk, which produces a great discharge of dust from the anthers. *Legumes* erect, linear, pointed, compressed between the seeds, margin three-keeled. *Seeds* from eight to twelve.

The young tender legumes are much used by the natives in their curries, stews, &c. Cattle are also fond of the plant.

*GLYCINE. Schreb. gen. N.* 1182.

*Calyx* two-lipped. *Keel* of the corol, reflecting the banner at top.

1. G. *debilis. Willd.* iii. 1060.

Half diffuse, half twining, hairy. *Leaves* ternate; *leaflets*

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round-obovate. *Racemes* axillary, intercepted. *Legumes* nearly straight, with an erect beak.

*Sans.* Masha purnee.

*Beng.* Mashanee.

Is a native of Bengal and other parts of India, but scarce. Flowering time the rains; the seed ripens during the cold season.

*Root*, (I believe) perennial. *Stem* none, but many slender, diffuse, hairy branches spreading on the ground, with twining extremities, when they meet with support. *Leaves* ternate. *Leaflets* roundish, obovate, hoary, and hairy underneath; veins parallel. *Petioles* channelled, hairy. *Stipules* of the petioles and leaflets ensiform. *Racemes* axillary, solitary, hairy, about as long as the leaves. *Flowers* in small, remote fasciculi, minute, of a deep reddish violet. *Legumes* nearly straight, hairy, beak erect. *Seeds* about six or seven.

2. G. *labialis. Roxb.*

Perennial, twining. *Leaves* ternate; *leaflets* ovate-oblong. *Filaments* alternately sterile. *Corol* nearly two-lipped.

A pretty extensive, shrubby species, common on banks of water courses, in forests, &c. Flowers during the rains.

*Stem* woody, twining, slender, a little hairy. *Leaves* ternate. *Leaflets* ovate, entire, a little hairy on the under side, of a deep green above, about an inch and a half long. *Petioles* channelled. *Stipules* acute, hairy; those of the leaflets subulate. *Racemes* axillary, longer than the leaves, interrupted. *Flowers* numerous, small, rose-coloured, collected on the alternate glandular tuberosities of the raceme. *Calyx* hairy. *Banner* emarginate, with the sides reflected. *Wings* projecting, horizontal, hiding the keel, which makes the flowers appear two-lipped rather than papilionaceous; *keel* short, as if truncated. *Filaments* one and nine, alternately shorter and sterile. *Anthers* five, oval, incumbent on the five longer filaments. *Legumes* straight, short, round, erect, obtuse, strong pointed, from six to twelve-seeded.

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3. G. *tenuiflora. Willd.* iii. 1059.

Perennial, twining, filiform. *Leaves* ternate; *leaflets* ovate-oblong, smooth. *Racemes* axillary, longer than the leaves. *Flowers* fascicled.

A rare plant, a native of low, rich pasture ground, among bushes, near Samulkota. Flowering time the rainy season.

*Root* woody, perennial. *Stem* or *branches* many, twining, filiform, round, slightly woolly when examined with a lens, from two to three feet long. *Leaves* ternate. *Leaflets* broad-lanceolate, obtuse with a small point, smooth, from one to two inches long. *Petioles* round, a little hairy. *Stipules* of the petioles acute, withering; those of the leaflets small, bristle-like. *Racemes* axillary, generally solitary, and larger than the leaves, interrupted. *Bractes* small, pointed, two pressing on the calyx. *Flowers* rose-coloured, collected in little heads of from two to four on the glandular tuberosities of the raceme. *Calyx* four-parted; *upper divisions* largest, pointed, resting on the banner. *Style* and *stigma* smooth. *Legumes* erect, compressed, from four to eight-seeded.

*CYLISTA. Schreb. gen. N.* 1759.

*Calyx* very large, four-parted; *upper division* cleft at the end. *Corol* permanent, legume two-seeded.

1. C. *tomentosa. Roxb. Ind. pl. N.* 221.

Perennial, twining. *Divisions* of the *calyx* cuneate. *Legume* of one or two round lobes, with one round, blue-violet, highly polished seed in each.

Is a native of Mysore, where it was discovered by Dr. Buchanan, and the seeds sent by him to the Botanic garden, where the plants thrive well, and blossom about the close of the rains, and during the cold season; the seed ripens in March and April.

*Stem* perennial, short, with but few stunted branches in its native, sterile soil, but in the Botanic garden the second year

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the branches lengthened much, and twined to a considerable extent, the young parts are round, and downy. *Leaves* ternate. *Leaflets* cordate, entire, downy, from two to three inches long, and from one to two broad. *Petioles* channelled, downy. *Stipules* of the petioles lanceolate; of the leaflets subulate. *Racemes* axillary, shorter than the leaves. *Flowers* yellow. *Calyx* to the base four-cleft, downy, permanent; *divisions* cuneate; the upper one broad, two-parted. *Corol* papilionaceous, shorter than the calyx, withering, but not dropping. *Legume* of one, or two, nearly spherical, villous lobes; when two, about as long as the calyx. *Seed* a single, round, highly polished, deep violet-blue one, of the size of a pea, in each lobe of the legume.

2. C. *scariosa. Willd.* iii. 1068. *Corom. pl.* 1. *N.* 92.

Perennial, twining. *Calyx* reticulate, scariose. *Seed* reniform, compressed.

This plant is perennial with a woody twining stem, a native of the mountainous parts of the Circars.

*Leaves* ternate. *Leaflets* entire, downy, pointed, the exterior one long rhombiform; the pairs obliquely ovate. *Stipules* short, cordate. *Racemes* axillary, erect, as long as the leaves. *Flowers* many, yellow, hid in the calyx, except just when expanded, and then only appearing in front. *Calyx* one-leaved, four-parted, chaffy, slightly downy, beautifully reticulate with coloured veins; *upper division* shortest, broad, retuse; *under division* long, retuse; *lateral parts* smallest, cordate, all are permanent. *Corol*, *stamens*, and *pistillum* as in *Dolichos*. *Legumes* obliquely oval, downy, hid in the calyx. *Seed* one, flat, reniform.

*CLITORIA. Schreb. gen. N.* 1183.

*Corol* supine; *banner* large, expanding under the wings.

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1. C. *Ternatea. Willd.* iii. 1068.

Shrubby, twining. *Leaves* pinnate. *Peduncles* axillary, one-flowered.

*Teling.* Nella dintana, the blue flowered variety; and tella dintana the white.

*Sans.* Asphota, *U*parajita.

*Beng. U*parajita.

Flos cœruleus. *Rumph. Amb.* v. *t.* 31.

Schanga cuspi. *Rheed. Mal.* viii. *t.* 38.

Common in every hedge all over India, and in flower the greater part of the year. Its root probably is not inferior to jalap as a cathartic; the powdered seed is also purgative.

2. C. *heterophylla. Lamarck.*

Perennial, twining. *Leaves* pinnate. *Leaflets* three, five, seven, or nine, from round to linear.

It is in flower and seed the whole year. Its delicate twining habit, variously shaped leaves, and beautiful azure flowers render it very ornamental.

*PISUM. Schreb. gen. N.* 1184.

*Style* triangular, above keeled, pubescent. *Calyx* with the two upper segments shorter.

P. *sativum. Willd.* iii. 1070.

*Petioles* round. *Stipules* rounded at bottom and crenate. *Peduncles* many-flowered.

*Hind.* and *Beng.* Mutur, the Patna or common white field pea, and Choota Mutur a small, round greenish variety of the common gray field pea. The former is cultivated extensively in the fields about Patna; and to the westward; the other variety is cultivated in every part of Bengal during the cold season.



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*LATHYRUS. Schreb. gen. N.* 1186.

*Style* flat, villous above, broader upwards. Two superior divisions of the calyx shorter.

1. L. *Aphaca. Willd.* iii. 1077.

*Peduncles* one-flowered. *Tendrils* leafless. *Stipules* sessile, sagittate-cordate, and obtuse.

*Beng.* Musoor chuna.

Although the stipules do not agree perfectly with Miller's figure, which represents them acute and with short petioles; yet I think they can be nothing more than varieties of the same species.

The flowers of the Indian sort are yellow, the legumes flat, and with four or five seeds. Curtis's figure in his *Flora Londinensis* is more like our Indian variety in the stipulæ, but his legume has seven or eight seeds.

2. L. *sativus. Willd.* iii. 1079.

*Stem* climbing, smooth, four-seeded, with two of its angles winged. *Peduncles* one-flowered. *Tendrils* four-leaved.* *Stipules* adjoined, ovate-lanceolate. *Legumes* ovate-oblong, with a double keel on the back.

*Beng.* Kesari.

Is sown on a strong, rich soil, about the close of the rains, in October; the harvest is three or four months after. Like other leguminous plants, it affords much wholesome, green fodder for cattle; and the seeds, when the plant is suffered to remain till they are ripe, are used in diet by the natives.

* I have seen a whole field with two pair of leaflets to the tendril; and near it another, in which there were only one pair; the former by far the most luxuriant of the two, though in soil there appeared to be no difference whatever.

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*VICIA. Schreb. gen. N.* 1187.

*Stigma* transversely bearded on the lower side.

1. V. *sativa. Willd.* iii. 1104.

Procumbent, angular. *Tendrils* with from four to six pair of sub-opposite, retuse, from linear to obcordate leaflets. *Stipules* adjoined, marked underneath. *Flowers* always solitary, sessile. *Legume* horizontal, cylindric, from six to eighteen seeded.

*Beng.* Ankari.

A native of Bengal and the provinces to the northward. When young the mark on the under side of the stipules is a glandular concavity, filled with a pellucid liquid, which dries up as the stipules get old, leaving a brown mark only.

It is seldom or never cultivated in Bengal, but is common in its wild state. When it meets with a suitable soil, it spreads over a full yard of surface, with numerous succulent branches and leaves, which cattle are fond of.

2. V. *Faba. Willd.* iii. 1111.

*Stem* upright; *petioles* without tendrils.

A small, smooth, brown-seeded variety of the *Faba minor* or *Horse bean*, is found in a cultivated state in Nepal, and from thence it has been introduced into the gentlemen's gardens at Purnea, and from thence into the Botanic garden, where it thrives luxuriantly during the dry season.

*ERVUM. Schreb. gen. N.* 1188.

*Calyx* five parted, the length of the corol. *Stigma* capitate, hairy.

E. *hirsutum. Willd.* iii. 1113.

*Peduncles* many-flowered. *Legumes* hairy, with two round seeds. *Leaflets* linear, smooth.



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*Beng.* Musoor chuna.

*Hind.* Jhunjhuni-ankari.

*Stems* numerous, slender, four-sided, smooth. *Peduncles* shorter than the leaves, from three to six-flowered. *Tendril* three-cleft, from ten to twelve-leaved. *Leaflets* sub-alternate, linear, smooth. *Stipules* subulate, often pinnatifid. *Legumes* hairy, two-seeded. *Seeds* globular.

This is a small, delicate annual, a native of Bengal. It appears during the cold season on cultivated lands. In the interior provinces it is cultivated for fodder.

*CICER. Schreb. gen. N.* 1189.

*Calyx* five parted, the length of the corol; the four segments incumbent on the banner. *Legume* rhombed, turgid, two-seeded.

1. C. *arietinum. Willd.* iii. 1113.

*Leaflets* serrate.

Chick pea.

Sunaga, the Telinga name of the plant, and Sunagalloo the grain.

*Beng.* Boot, Boot kuluy, or Chola.

Very universally cultivated throughout India during the cold season.

2. C. *Lens. Willd.* iii. 1114.

Erect, ramous, pubescent. *Stipules* lanceolate, entire. *Peduncles* two-flowered, with an abortive pedicel. *Calyx* rather longer than the corol. *Legume* two-seeded.

*Beng.* and *Hind.* Mussoor.

This plant is cultivated to considerable extent by the natives of Bengal, and other adjoining provinces, during the cold season.

*Stem* short, erect, very ramous. *Branches* sub-erect, angular, downy; whole plant from one to two feet high. *Leaves*

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alternate. *Leaflets* from four to six pair, sub-opposite, lanceolate, pubescent. *Petioles* ending in a short, simple tendril, which does not take hold of any thing to support the plant. *Peduncles* axillary, the length of the leaves, each supporting two small white flowers, and then ending in a short filament beyond them. *Calyx* rather longer than the corol. *Stigma* somewhat villous before. *Legume* rhomboidal, smooth, containing two, round, compressed, gray, minutely spotted seeds. The seeds form an article in the diet of the natives.

*CYTISUS. Schreb. gen. N.* 1191.

*Calyx* two-lipped; *upper division* two-parted; the *under* one three-toothed. *Legume* attenuated at the base.

C. *Cajan. Willd.* iii. 1121.

*Racemes* axillary, erect. *Leaflets* sub-lanceolate. *Legume* pointed, and obliquely grooved between the seeds.

Thora-poru. *Rheed. Mal.* vi. *t.* 13. *Burm. Zeyl. t.* 57.

*Beng. Urhur.*

*Teling.* Pedda Candi is the name of the large sort, and Pedda Kandiloo the grain.

It is much cultivated; and it is only in that state that I have ever found it. To appearance it is a large shrub, of some years' duration, however with the greatest care it seldom lives longer than two or three. The natives call it annual, because they do not find it bear well the second year; of course, after collecting the first crop, they pull it up for firewood, &c.

*Stem* short but straight, woody, often as thick as a man's leg, very ramous. *Branches* ascending, striated from the insertion of the leaves; height of the whole plant from five to ten feet. *Leaves* ternate. *Leaflets* oblong, equal, entire, acute, soft, downy, below whitish, about two inches long, and one and three quarters broad. *Petioles* channelled, striated. *Stipules* cordate, pointed, withering. *Racemes* axillary, as

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long as the leaves, erect, a little downy. *Bractes* oblong, concave, pointed, downy, two-flowered. *Flowers* pretty large, yellow. *Filaments* alternately longer; *anthers* equal. *Legume* globularly protuberant at the seed, the contractions between them oblique; downy, spotted with dark purple; about an inch long. *Seeds* three or four, of the size of a small pea, round, smooth, light brown. Beside the above described, there is a smaller variety; they differ however only in appearance and size, the first growing to be from six to eight feet high, with a circumference of twenty feet round the extremities of the branches. The second seldom or never more than half the size; but they differ more in respect to the length of time they take to ripen their seeds, the first requiring about nine months from the time it was sown, and yielding a produce of about six hundred-fold. The other, only three months, and yielding generally less than one hundred-fold.

They both require a high, dry, light, rich soil. The first sort is commonly sown, with the first rains, in June; the second about September.

This grain is in high esteem by all classes of the natives; it holds the third rank amongst the leguminous seeds, and is next in value after the Chick Pea.

Cattle are fond of the tender parts of the plant, whether green or dry. The dry wood is excellent fuel, beside it is one of the best for producing fire by friction. The natives say there is a third sort cultivated on the high hills which form the north boundary of the Circars, but I have never been able to meet with it.

### *ROBINIA. Schreb. gen. N.* 1194.

*Calyx* campanulate, division of its mouth unequal and generally four. *Legume* gibbous at the seeds, elongated.

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1. R. *candida. Roxb.*

Shrubby, erect, unarmed. *Leaves* unequally pinnate; *Leaflets* ten-paired, lanceolate. *Racemes* terminal or axillary, pedicels one-flowered. *Legumes* linear, many-seeded.

This elegant, large shrub, was first reared in the Company's Botanic garden, from seed collected in the north of Bengal by Dr. Carey. Flowering time the cold season.

*Stem* erect, ligneous; *branches* expanding; the young parts villous, and clouded with dark and brighter green; the woody parts smoother and ash-coloured; the whole height when full-grown from five to eight feet. *Leaves* alternate, unequally pinnate, from six to eight inches long. *Leaflets* opposite, short-petiolated, generally from ten to twelve, linear-lanceolate, entire, dagger-pointed, villous underneath, and on the margins, about two inches long. *Petioles* villous, channelled. *Stipules* tapering to a fine long point. *Racemes* terminal, and axillary, short, few-flowered. *Pedicels* one-flowered, nodding. *Bractes* small, caducous, flowers large, pure white, inodorous. *Banner* covered with gray down on the back, pure white and smooth within. *Legume* linear, many-seeded.

2. R. *suberosa. Roxb.*

Arboreous; *bark* suberous, deeply cracked. *Racemes* terminal; *pedicels* one-flowered. *Leaflets* from five to seven paired, with an odd one. *Legume* linear, many-seeded.

For this beautiful plant we are also indebted to Dr. Carey, who sent the seeds from the district of Dinajpoor, to the Botanic garden at Calcutta, where it grows well and is in blossom during the rains chiefly.

*Trunk* erect, soon branching out into a large ramous head, whole height of the plant when full grown eight or nine feet. *Bark* ash-coloured, that of the trunk deeply split and of a corky nature. *Leaves* alternate, abruptly pinnate. *Leaflets* from five to six pairs, opposite, oblong, entire, above smooth, underneath hoary, the largest exterior ones about an inch long. *Stipules* minute, caducous. *Flowers* large, of a deep

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rose-colour, collected on terminal racemes, each furnished with a long pedicel. *Calyx* four-parted, the upper division more removed and two-pointed. *Legume* about four inches long, linear, compressed, with six or eight flattened reniform seeds.

It is a very ornamental plant, particularly while young.

3. R. *Sennoides. Roxb.*

Shrubby, unarmed. *Leaflets* from eight to ten pair, lanceolate. *Racemes* terminal. *Flowers* large, blue, threefold. *Calyx* four-toothed.

Cytisus *sericeus. Willd.* iii. 1121.

A native of the Circars; flowering in the hot season.

4. R. *fruticosa. Roxb.*

Shrubby, ultimately twining. *Leaflets* from three to four pair with a terminal one, linear oblong. *Racemes* axillary. *Banner* with two callosities at the base. *Legume* flat, from four to six-seeded.

A native of the interior parts of Bengal. From Chupra Mr. Charles Boddam sent seeds to the Botanic garden in 1803, where the plants blossom during the rains, and ripen their seed in January.

*Trunk* short. *Branches* erect, the longest shoots began to twine in plants of four and five years of age, when they were not more than from three to six feet high. *Bark* of the older ligneous parts somewhat scabrous, that of the tender shoots villous. *Leaves* alternate, unequally pinnate, from six to twelve inches long. *Leaflets* from three to five pair, opposite, linear oblong, those nearest the apex and particularly the terminal one, cuneate, all are entire, obtuse, and nearly smooth on both sides, from two to six inches long, and about one and a half broad. *Petioles* common, villous and slightly channelled, much swollen at the base. *Stipules* of the petioles triangular, those of the leaflets subulate. *Racemes* or rather *spikes* axillary, generally single, and simple, much shorter

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than the leaves. *Flowers* sub-sessile, middle sized, rose-coloured, always in pairs, from round, elevated glands. *Bractes* tern, a small and cordate one below each gland which is persistent; and two lateral on the gland, which are caducous; besides there are two to each calyx, which press on its base laterally. *Calyx* somewhat gibbous, four-toothed, the upper one broader, shorter and emarginate. *Banner* with two remarkable callosities rising from the base in the inside. *Filaments* one and nine. *Anthers* equal, roundish. *Germ* inserted into a cup-shaped nectary with the filaments. *Stigma* naked. *Legume* linear-lanceolate, thin, from four to six-seeded.

5. R. *macrophylla. R.*

Shrubby, scandent, unarmed. *Leaves* unequally pinnate; *leaflets* from three to four, sub-obovate, oblong. *Racemes* axillary; *pedicels* one-flowered. *Banner* sub-rotund, deeply emarginate, with two short callosities at the base. *Legume* linear, flat, downy.

A native of the exterior parts of Bengal, where it grows to be large, woody, and scandent. Flowering time in the Botanic garden, June and July; the seeds ripen in April.

6. R. *ferruginea.*

Shrubby, the tender parts clothed with ferruginous down. *Leaves* unequally pinnate; *leaflets* seven or nine, linear-oblong. *Panicles* terminal and axillary; *flowers* sub-fascicled.

A very ramous scandent shrub, a native of Silhet, where it flowers in April.

7. R. *racemosa. R.*

Shrubby, climbing. *Leaflets* six-paired, with a terminal one; *stipules* subulate. *Racemes* nearly as long as the leaves, many-flowered. *Legume* pendulous. *Seed* from five to six, remote.

*Teling.* Galuga.



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A large climbing shrub; a native of the extensive forests among the Circar mountains.

*Stem* woody, climbing over trees, &c. *Bark* scabrous with a gray roughness. *Leaves* erect, alternate, pinnate with an odd one, about nine inches long. *Leaflets* opposite, six pair, oval, acute, entire, smooth; two inches long, and one broad. *Petioles* round, smooth. *Stipules* of the petioles and leaflets awled, shorter than the leaves. *Racemes* axillary, erect; many-flowered. *Bractes* awled, one-flowered. *Flowers* numerous, large, rose-coloured. *Calyx* slightly five-toothed. *Banner* emarginate. *Wings* falcate. *Nectary*, a crenulated cup surrounding the base of the germ, as in some species of *Dolichos*. *Legumes* straight, pendulous, from six to nine inches long, and as thick as the fore finger, very protuberant at the seeds, and perfectly compressed between them. *Seeds* remote, from five to six, oblong.

I do not know of any use to which any part of this plant is put.

*AESCHYNOMENE. Schreb. gen. N.* 1202.

*Calyx* bilabiate. *Filaments* simple, nine-cleft. *Legume* long, straight, slender and acute, with a partition between the seeds.

*Note.* So far do I agree with Gærtner in the division of this genus, as to consider the only two species I have yet found in India, with articulated legumes, *Hedysarums*. But the other species with long, slender, torulose pods, intercepted between the rather remote seeds (and void of every appearance of a joint, or articulation between them) I shall consider to belong to the family in which they have hitherto been placed, but under an *essential generic* character considerably altered.

1. A. *grandiflora.*

Unarmed, arboreous. *Leaflets* ten-paired. *Peduncles* from

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two to three-flowered, pendulous. *Calyx* of two entire lips. *Legumes* pendulous, very long, linear; the *upper margin* broad and channelled, many-seeded.

Coronilla *grandiflora*. *Willd.* iii. 1145.

Agati. *Rheed. Mal.* i. *t.* 51.

*Sans.* Buka.

*Beng.* Buka, also Augasta.

*Hind.* Basna the red-flowered variety, and Sada basna the white.

*Tam.* Agati.

*Teling.* Yerra avesi the name of the red-flowered variety, Tella avesi the white-flowered.

A small, delicate, but high, viz. from twenty to thirty feet, tree of only a few years' duration. It is generally found in the vicinity of villages, where the natives encourage its growth, for the sake of the leaves and tender pods which they use in their curries. It is in flower and fruit most part of the year.

*Trunk* straight, from ten to twelve feet high. *Bark* pretty smooth. *Branches* thinly scattered. *Leaves* alternate-abruptly pinnate, from six to nine inches long. *Leaflets* opposite, from eight to twelve pairs, linear-oblong, obtuse, entire, smooth, of a whitish-green, about an inch long, and three-eighths broad. *Stipules* of the petioles half lanced, caducous; those of the leaflets minute. *Peduncles* axillary, short, somewhat downy, from two to four-flowered; *pedicels* peduncle-like. *Bractes* minute, falling. *Flowers* very large, red or white. *Calyx* two-lipped; *lips* entire. *Banner* erect, oval. *Anthers* linear. *Legumes* pedicelled, from twelve to eighteen inches long, and about as thick as a common quill, pointed, a little compressed; the upper suture channelled, protuberant at, and intercepted between the seeds, but not in the least jointed. *Seeds* numerous, kidney-formed.

The tender leaves and young legumes are much used in food, by all classes of the natives.

The tree is employed for training the *Betle* plant (*Piper*



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*betel)*, it admits of the sun's beams, and the wind, better than any other of its height, being thin of branches and leaves, particularly after it is more than one year old. It is of a very quick growth, which is another reason for employing it. The wood is only fit for fuel. Cattle eat the leaves and tender parts.

2. A. *sesban.*

Unarmed, arboreous. *Leaflets* about fifteen pair. *Racemes* pendulous. *Legumes* filiform, pendulous.

Kedangu. *Rheed. Mal.* vi. *t.* 27.

Emerus. *Burm. Zeyl. t.* 41.

*Sans.* Juyunti. See *Asiat. Res.* iv. *p.* 297.

*Beng.* Juyunti.

Coronilla sesban. *Willd.* iii. 1147.

If the true *Sesban* has an articulate legume, as stated by the accurate Vahl, *(Symb.* i. *p.* 54.*)* this cannot be it.

*Teling.* Suiminta.

This small beautiful tree is in general found in the vicinity of villages, and is likewise of few years' duration. Flowers chiefly during the wet and cold seasons.

*Trunk* erect, about eight feet high. *Bark* cracked. *Branches* numerous, extremities twiggy, and often bowing. *Leaves* abruptly pinnate, from four to six inches long. *Leaflets* opposite, from ten to twenty pair, linear-obtuse, smooth, entire, about an inch long, and one-third of an inch broad. *Stipules* very acute, reflexed. *Racemes* axillary, pendulous, from eight to twelve-flowered. *Flowers* large; of a beautiful dark purple with yellow spots.

There is a variety of this tree with yellow flowers which is not so elegant as the above described. I have also seen another with red flowers.

The wood is said to make the very best charcoal for gunpowder.

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3. A. *spinulosa. Roxb.*

Annual, sub-ligneous, erect; armed with inoffensive prickles. *Leaflets* from twenty to forty pair; *petioles* armed on the under side. *Legumes* erect, filiform.

Coronilla *aculeata. Willd.* iii. 1147.

*Teling.* Yerra-Jelooga.

A large shrubby-like annual, growing to be four or five feet high. It appears in rice fields during the rainy season. Flowers in December and January.

*Stem* erect, woody, annual. *Branches* remote, slender; *bark* reddish, covered with many small, inoffensive prickles. *Leaves* abruptly pinnate, from three to twelve inches long. *Leaflets* opposite, numerous, *i. e.* forty pair, linear, obtuse with a minute bristle, smooth, half or three quarters of an inch long, and one-eighth broad. *Petioles* armed on the under side with inoffensive prickles, like those of the stem and branches. *Stipules* linear, very sharp, falling. *Racemes* axillary, many times shorter than the leaves, spreading. *Flowers* few, yellow, middle sized. *Legumes* erect, sharp-pointed, about as thick as a pack thread, and eight or nine inches long, protuberant at the seed, but not jointed. *Seeds* kidney-form.

4. A. *paludosa. Roxb.*

Annual, sub-ligneous, erect. *Leaflets* from ten to twenty pair. *Racemes* longer than the leaves, drooping, many-flowered. *Legumes* linear, pendulous.

*Beng.* Kathsola.

This is a very large annual species; it has the appearance of an elegant tree, often twelve feet high, is a native of wet marshy places about Calcutta; it appears during the rains.

*Root* annual, spindle-formed, with some few lateral branches. *Stem* erect, ramous; all the parts under water are much swelled and are there of an exceeding light spongy texture, but not piped; these parts emit numerous, ramous, filiform roots, from every part, and except for the insertions of those radicles the bark is continuous, smooth, and green in

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most parts, the parts above the water contract to about a third the thickness of those that are immersed, and are covered with smooth, shining, green bark; height of the whole plant from six to twelve feet, the relative proportion of the immersed and exposed parts depends on the height of the inundation. *Leaves* sessile, abruptly pinnate, linear, from six to twelve inches long, horizontal, courting the solar light through the day, and drooping in its absence. *Leaflets* generally opposite, sessile, from ten to thirty pair, tapering a little from the base, where they are broadest, to the apex, rounded at both ends, with a bristle-like point, smooth above, and having a few hairs below, from an inch, to an inch and a half long, and three-eighths of an inch broad at the base. *Petioles* swelled at the glandular base, channelled; *channel* hairy. *Stipules* half lanceolate, falling; those of the leaflets subulate, permanent, minute. *Racemes* axillary, peduncled, solitary, drooping beautifully, from eight to twelve-flowered, longer than the leaves which they accompany. *Flowers* drooping, as large as those of Spanish broom, of a bright yellow, with the back of the banner spotted with distinct, round, purple dots. *Bractes*, those of the pedicel solitary, those of the calyx two, pressing on it laterally, all are boat-shaped and deciduous. *Calyx; corol, &c.* as in *A. Cannabina.*

5. O. *Uliginosa. Roxb.*

Annual, diffuse; *leaflets* forty pair. *Racemes* sub-sessile, erect, from six to eight-flowered. *Legume* erect, cuspidate.

It is a native of marshy places near Calcutta, appearing and flowering in the rains.

*Stems* annual, ramous, spreading. *Branches* sometimes slightly and remotely murexed, as in *A. procumbens*, which it resembles much; *leaflets* from thirty to fifty pair, linear, with a point, and bright red margins, smooth on both sides. *Stipules* as in the other species. *Racemes* axillary, sub-sessile, from six to eight-flowered. *Flowers* short-pedicelled, approximate. *Banner* and *wings* yellow; *keel* purple.

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*Note.* The parts under water are swelled, like those of the last described species. It differs from O. *procumbens*, in having twice the number of leaflets to the leaf, and more than twice the number of flowers on the raceme.

6. O. *Cannabina* of *König*. See *Retz. Obs.* v. 26.

Annual, straight. *Leaflets* from twenty to forty pair. *Racemes* axillary, few-flowered. *Legumes* long, slender, somewhat four-sided.

Coronilla *Cannabina. Willd.* iii. 1148.

*Beng.* Dhunchi.

An annual species which I have not found wild. It is cultivated in various parts of Bengal for the fibres of its bark, which form a coarse substitute for hemp. The general seed time is in April; it is in flower four or five months after.

*Root* ramous, annual in a cultivated state. *Stem* simple, from six to twelve feet high, and about as thick as the little finger, smooth, towards the base somewhat woody, ramous near the top only, the most tender shoots are slightly striated, and a little hairy. *Leaves* sub-sessile, alternate, spreading in the day, pinnate, from six to twelve inches long. *Leaflets* from twenty to forty pair, opposite, rarely alternate, short-petioled, exactly linear, rounded at both ends, with a bristle-like point, having the upper side smooth, and the under one pale, with a few white hairs, from an inch to an inch and a half long, and about a quarter of an inch broad. *Petioles* slightly channelled, and a little hairy, with a swelled base. *Stipules* of the leaf half-lanced, falling; those of the leaflets awled, permanent. *Racemes* axillary, peduncled, solitary, shorter than the the leaves they accompany, bearing from two to six pedicelled, nodding flowers. *Flowers* about the size of a pea blossom, yellow, with many dark purple spots. *Bractes* of the pedicels solitary, boat-shaped, hairy, caducous; those of the flower two, linear, pressing on the calyx, caducous. *Calyx* gibbous, five-toothed, sub-equal. *Corol* papilionaceous. *Banner* obcordate, bright yellow on the inside, and beautifully

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marked with purple dots on the outside. *Wings* obovate, oblong, obtuse, yellow. *Keel* obtuse, daggered behind. *Filaments* alternately shorter, simple, and nine-cleft. *Anthers* round, incumbent. *Germ* cylindric, smooth. *Stigma* emarginate. *Legume* tending to be pendulous, from six to nine inches long, linear, somewhat angular, about as thick as a very slender quill, many-seeded. *Seeds* sub-cylindric, smooth, of a light brownish colour.

Cultivation of the Dhunchi plant, *Aeschynomene Cannabina, Kön.* in *Retz. Obs.* v. 26. *Coronilla Cannabina. Willd.* iii. 1148.

The soil generally employed for this plant about Calcutta, is wet and considerably lower than what is necessary for *Corchorus olitorius* and *capsularis*, and *Crotalaria juncea.** The preparation of the ground need not be so much attended to, as the plant is hardy, and the growth so rapid, as to destroy or keep down weeds of all kinds very completely. This, together with the crop being considered a meliorating one, renders it advantageous, notwithstanding the cheapness of the material. The time of sowing is when the soil has been moistened with the showers which fall during the storms called *north-westers* in May, which correspond with the *tornados* on the west coast of Africa. About fifteen seers, or thirty pounds, of seed to the acre is generally allowed, and less attention is paid to the weeding than is necessary for *Corchorus*. In September and October the crop is ready to cut, though the fibre does not suffer if left standing till the seed is ripe in November. The process of steeping and cleaning the fibre, is exactly similar to that already described for *Crotalaria juncea.*

The general produce of an acre is from one hundred, to one thousand pounds of ill cleaned fibre; the current price some-

* See the method of cultivating those plants in the *Fourth Report of the African Institution* and in the *Transactions of the Society of Arts, vol.* xxii. and xxiv.

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what less than *Paat*, viz. *Corchorus*. Expense of cultivation, including land-rent, about nine Rupees.

This is deemed the coarsest, though not the least durable of our Bengal substitutes for hemp. It is reckoned to be more durable in the water, or for purposes where it is often wet, than either *sun*, or *paat*; and is therefore universally employed for the drag ropes, and other cordage about fishing nets. The nets themselves are made of *sun twine*, well tanned with the bark of a species of *Rizophora*.

7. O. *procumbens. R.*

Annual, diffuse, somewhat armed with inoffensive prickles. *Leaflets* minute, about twenty pairs. *Peduncles* axillary, short, from two to three-flowered. *Legumes* linear, erect, cuspidate.

*Teling.* Manchi Jelooga.

A native of Coromandel; appearing on wet pasture land, borders of rice fields, &c. in the rainy season.

## *FLEMINGIA. R.*

*Calyx* five-cleft. *Stamina* one, and nine. *Legumes* sessile, oval, turgid, two-valved, one-celled, containing two spherical seeds.

This genus assigned to the name of Dr. John Fleming, Physician General in Bengal, consists of shrubby *Hedysarum*-like plants, natives of various parts of India. They are all perennial, the young shoots generally three-sided.

*Leaves* ternate; *leaflets* three-nerved. *Petioles* more or less winged, opposite, scariose. *Stipules* as in the *Hedysarums*. *Flowers* on axillary, or terminal, simple or compound racemes or panicles. In all the corol is pink, striped with yellowish purple lines. The essential mark is in the sessile, turgid, oval legumes, with regularly two round seeds in each.



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1. F. *procumbens. Roxb.*

Perennial, procumbent, three-sided, particularly when dry. *Racemes* axillary, the length of the leaves. *Legumes* and *calyx* besprinkled with garnet-coloured grains.

A native of the mountains north of Oude, and Rohilcund. In the Botanic garden it blossoms throughout the dry season.

*Root* perennial. *Stem* none, but many ramous, three-sided, villous, somewhat ligneous branches, springing from the crown of the root, and spreading flat on the ground, their length, in two years old plants, from one to two feet. *Leaves* ternate. *Leaflets* entire, villous underneath, somewhat three-nerved, and marked throughout with veins, the pair obliquely oval, the terminal one obovate. *Stipules* paired, stem-clasping, villous, caducous. *Racemes* axillary, generally solitary, about the length of the leaves, their upper half thickly set with short-pedicelled, small flowers, strongly marked with deeper coloured purplish lines. *Bractes* of the pedicel about as long as the pedicel, oblong, one-flowered, caducous; those of the calyx subulate, very small and also caducous. *Calyx* deeply five-cleft, hairy and marked with garnet-coloured glands on the outside. *Banner* roundish, strongly marked with deeper and lighter coloured lines; *wings* purple; *keel* pale rose. *Stamens* one, and nine. *Anthers* ovate. *Stigma* large, capitate. *Legume* sessile, oval, besprinkled with garnet-coloured glands, one-celled. *Seeds* two, spherical, gray, speckled with blackish brown.

2. F. *prostrata. Roxb. Jun.*

Somewhat shrubby, prostrate; *young parts* three-sided, and downy. *Leaflets* lanceolate, acute. *Racemes* axillary, solitary, length of the petioles. *Legume* villous.

This species was raised from seed sent by Mr. Kerr from China to the Botanic garden in 1805, where they blossom about the close of the rains, in November, and ripen their seed during the cool season.

*Root* perennial. *Stem* scarcely any. *Branches* procumbent;

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the older woody parts thereof round, the tender ones somewhat three-sided, and clothed with villous pubescence, their general length about two feet and a half. *Leaves* ternate as in the other species. *Leaflets* lanceolate, the pair obliquely so, acute, entire, three-nerved, slightly villous underneath; three or four inches long, and less than one broad. *Petioles* three-sided; angles sharp and ciliate. *Stipules* opposite, lanceolate, cuspidate, half the length of the petioles, villous, caducous. *Racemes* axillary, solitary, villous, becoming rather longer than the petioles by the time the flowers have expanded. *Bractes* solitary, one-flowered, lanceolate, clothed with silky hairs, caducous. *Flower* small, a mixture of pale yellow and purple. *Calyx* hairy, five-parted, clothed with long, fine, white hairs; segments acute, the lower one twice the length of the other four. *Legume* oval, two-seeded. *Seeds* round, dark brown, spotted with gray.

3. F. *nana. Roxb.*

Suffruticose, with a very short, ligneous stem, and few short branches. *Leaves* ternate. *Leaflets* sub-obovate; *petiole* winged. *Racemes* axillary, crowded. *Legume* covered with red clammy glands.

*Hind.* Supta Cusunt.

This beautiful, small, sub-herbaceous species was found by Col. Hardwicke in various parts in the vicinity of the Ganges toward Hurdwar, and by him introduced into this garden, where it blossoms about the beginning of the hot season.

*Stem* scarcely any, a short, perennial, ligneous stump, of scarcely an inch in length, is all that appears above ground, from which issue a few short, sub-herbaceous branches, the whole height, leaves included, not above six or eight inches. *Leaves* ternate, long-petioled. *Leaflets*, the pair obliquely oblong; the terminal one obovate; all are three-nerved and a little downy, from one to three inches long. *Petioles* as long, or longer than the leaflets, winged. *Stipules* ensiform. *Racemes* axillary, sub-sessile, from one to several to-



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gether. *Bractes* solitary, lanceolate, one-flowered. *Flowers* numerous, pedicelled, small, pale greenish pink, with deeper stripes. *Calyx* unequally five-cleft, besprinkled on the outside with numerous, minute, clammy, ferruginous glands. *Legume* oval, densely clothed with clammy reddish glands, as are, in some measure, the pedicels and racemes also.

4. F. *conjesta. Roxb.*

Shrubby, sub-erect. *Leaflets* broad lanceolate. *Racemes* axillary, sub-sessile, heaped.

*Beng.* and *Hind.* Bura salpan.

This species is a native of the Delta of the Ganges. Flowering time the cold season; the seed ripens in two or three months afterwards.

*Stems* several, oblique, woody; *young parts* villous. *Branches* few, general height of the whole plant from three to six feet. *Leaves* ternate. *Leaflets* short-petioled, three-nerved, entire, pretty smooth above, villous underneath, the terminal one broad-lanceolate; the lateral ones of nearly the same size, and shape, but broader at the base and less distinctly marked with the three nerves, about six or eight inches long. *Petioles* nearly round, and villous. *Stipules* rather short, tapering from a broad base to a fine point. *Racemes* axillary, generally crowded, about as long as the petioles. *Bractes* shorter than the calyx, one-flowered, caducous. *Flowers* very numerous, and beautifully striated with orange and purple. *Legume* the length of the lower division of the calyx, sub-reniform, one-jointed, two-seeded.

This species has much the habit of my F. *stricta*, but differs widely in its specific character. In this the racemes are crowded, in that single; in this the bractes are shorter than the flowers, in that several times longer.

5. F. *semialata. Roxb.*

Shrubby, ramous. *Leaves* ternate. *Leaflets* oblong, acute,

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three-nerved ; *petioles* winged. *Racemes* terminal, and axillary, panicled.

A native of Nepal, from thence Dr. Buchanan sent the seed to this garden, where in little more than one year, the plants were tall, elegant, ramous, stout, erect shrubs, with the bark of the ligneous parts dark brown, and smooth, of the tender parts villous. *Leaves* ternate. *Leaflets* nearly equal, broad-lanceolate, entire, fine-pointed, smooth on both sides, from four to six inches long, and from one and a half to two broad. *Petioles* shorter than the leaves, with broad membranaceous villous margins. *Racemes* axillary, and terminal, generally compound, particularly the terminal ones, and they are often panicled. *Bractes* chaffy, lanceolate, one-flowered, caducous. *Flowers* numerous, large, rose-coloured, striated with greenish yellow, and purple. *Calyx* villous; *segments* five, nearly equal, ensiform, about as long as the corol. *Filaments* one and nine. The single one greatly enlarged near the base. *Legume* sessile, oval, slightly villous, turgid, the size of a field bean. *Seeds* small, perfectly round, smooth, shining black.

6. F. *lineata. R.*

Shrubby, erect, ramous. *Leaflets* obovate-cuneate, three-nerved, and strongly marked with veins. *Stipules* stem-clasping, scarious. *Racemes* axillary, long-peduncled, subsecund, often compound. *Legumes* villous, and mealy.

Heydysarum lineatum. *Linn. Burm. Fl. Ind.* 167. *t.* 53. *f.* 1.

A native of the Peninsula of India. Flowers during the rainy and cold seasons.

7. F. *angustifolia. R.*

Shrubby, straight. *Leaflets* lanceolate, villous underneath. *Racemes*, or heads, terminal, and from the exterior axills, solitary, sessile, scarcely the length of the petioles. *Legumes* villous.

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This species was discovered by Colonel Hardwicke growing in the vicinity of Hurdwar.

8. F. *stricta. Roxb.*

*Stems* many, shrubby, straight. *Leaves* ternate; *leaflets* broad-lanceolate, smooth. *Racemes* axillary, erect. *Stipules* and *bractes* lanceolate, caducous. *Legume* smooth.

A large shrubby species, a native of the mountainous parts of the coast. Flowers during the cold season.

*Stems* numerous, erect, with very few branches, which are also erect. *Bark* smooth. *Leaves* alternate, petioled, ternate. *Leaflets* nearly equal, broad-lanceolate, entire, fine pointed, a little wrinkled, about nine inches long and three broad. *Petioles* three-sided; upper side even, the lateral faces striated. *Stipules* of the petioles sheathing, remarkably large, surrounding the extremities of the branches, and overlapping each other, falling; those of the leaflets wanting. *Racemes* axillary, solitary, erect, the length of the petioles, short-peduncled, the peduncle is hid in large sheath-like bractes, and every part above is imbricated with the flowers. *Bractes* of the flowers solitary, lanceolate, one-flowered, falling. *Flowers* very numerous, beautifully striated with red, yellow, and violet. *Legumes* not jointed, oval, pointed, two-seeded; *seeds* spherical.

This plant has flowered in my garden for several years, it is pretty only when in flower.

*SMITHIA. Schreb. gen. N.* 1760.

*Calyx* bilabiate. *Filaments* ten, united into two equal bodies. *Legumes* composed of one-seeded joints.

1. S. *sensitiva. Ait. Kew.* iii. *p.* 490. *&c.* 512. *t.* 13. *Willd.* iii. 1161.

Biennial or triennial, diffuse. *Leaflets* from three to six paired, with the margins, the under side of the nerve, and the

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petioles ciliate. *Legumes* six-jointed, and folded within the calyx.

*Hind.* Oda-Breeni.

*Beng.* Nulla Kashina.

*Pentagnana sensitiva. Gmel. ed. syst.* ii. 1119.

A native of Bengal, where it is common on moist pasture land. Blossoms and ripens its seed during the cold season; cattle are fond of it. It is common in the Botanic garden, and makes excellent hay.

2. S. *aspera. Roxb.*

Annual, erect; *leaflets* from thirty to forty pair. *Legume* exsert, pedicelled. *Joints* from six to eight, rugged in the middle.

*Beng.* Kath Sola.

A native of Bengal, where it is found with the former species on low wet pasture land, borders of rice fields, &c. appearing with the rains in May and June, and perishing when they are over in October, and November.

*Stem* erect, from two to six feet high, fistulous. *Branches* short, spreading. *Bark* somewhat scabrous, with small coloured glands, &c. bristles scattered over all the tender parts of the plant. *Leaves* alternate, pinnate, from two to six inches long. *Leaflets* from twenty to fifty pair, linear, oblong, smooth, with reddish margins. *Stipules* adjoined, ovate, lanceolate, ciliate. *Racemes* axillary and terminal, flexuous, from two to six-flowered. *Flowers* rather remote, middle sized, yellowish. *Bractes* ovate, and ovate cordate, two pressing on the calyx laterally like a calycle, and one at the origin of each pedicel, their margins are serrate, coloured and ciliate. *Calyx* bilabiate. *Segments* oval, equal, and emarginate. *Corol, banner* round-oval, twice the length of the calyx. *Wings* oblong, long-clawed. *Keel* boat-shaped, two parted at the base. *Filaments* ten, united into two equal bodies. *Germ* pedicelled. *Style* ascending. *Stigma* simple, even with the anthers. *Legumes* pedicelled, linear,

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nearly straight, slightly crenate on the under margin, from six to ten jointed; *joints* nearly square, swelled, and scabrous at the middle. *Seed* reniform, pale brown.

*Note.* Until I observed this plant I was inclined to consider *Smithia sensitiva*, a species of *Hedysarum*, but on finding this agree as well in its natural and essential characters with Aiton's species, I have been induced to consider them as constituting a well marked genus, differing essentially in both calyx and stamens from *Aeschynomene*, and *Hedysarum*.

*HEDYSARUM. Schreb. gen. N.* 1204.

*Corol* with keel transversely obtuse. *Loment* articulated with one seed in each.

*Note.* Those with a folded legume or rather loment of two or more roundish joints have peculiarities sufficient to authorize their being separated from this inconveniently overgrown genus. I have already six species which would form a pretty good foundation for the new family, viz. a new one with simple leaves, *lagopodioides*, &c. also, *alopecuroides* with ternate leaves, and with pinnate leaves *pictum*, and *Crinitum*.

SECT. I. *Leaves simple.*

1. H. *alhagi. Willd.* iii. 1171.

Shrubby, armed. *Leaves* oblong, mucronate. *Stipules* ensiform.

*Sans.* Yasa, or yavasa.

*Hind.* Juwasa.

*Pers.* Shooturk has from its being the common food of the camel.

A native of Hindoostan, and generally found in a dry, rather barren, sandy soil. Its branches are used for the screens, called Tattees, employed during the hot dry winds, common in

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many parts of Southern Asia. In the neighbourhood of Candahar and Mirut and the bank of the Chilchuk, manna is said to be procured from it. This substance exudes from the plant after spring rains and is gathered by merely shaking it off. See *Fothergill, p.* 257. In the Dooab, where it is common, it is for the most parts herbaceous and eaten down to the ground by cattle.

2. H. *moniliferum. Willd.* 1173.

Perennial, cespitose. *Leaves* round, cordate. *Heads* terminal. *Bractes* three-flowered. *Legume* necklace-shaped with round joints.

Hedysarum *moniliferum. Burm. Ind. t.* 52. *f.* 3. pretty good.

*Teling.* Amera.

Common on pasture land over most parts of India. Flowers in the rains and cold season.

3. H. *vaginale. Willd.* iii. 1176.

Perennial, cespitose. *Leaves* from oval to linear, oblong with cordate base, rather obtuse, smooth. *Racemes* leaf-opposed. *Bractes* three-fold, two-flowered. *Legume* sub-cylindric, from four to six-jointed.

Genista articulata, &c. *Burm. Zeyl. t.* 49. *f.* 1. pretty good.

Common on pasture land in most parts of India. Flowers in the rainy and cold seasons.

4. H. *procumbens. Roxb.*

Perennial, diffuse, hairy in every part. *Leaves* simple, roundish. *Racemes* leaf-opposed, flowers in pairs, remote. *Legumes* from two to four-jointed, both margins notched.

A small perennial; a native of dry, sandy pasture lands, though by no means common.

*Stem* there is nothing that can be so called. *Bractes* many, diffuse, long, round, slender, dichotomous, very hairy.



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*Leaves* alternate, short-petioled, oval, or orbicular with a small point, hairy. *Stipules* of the petioles embracing the branch, chaffy, half-lanceolate. *Racemes* leaf-opposed, lateral, all axillary, many times longer than the leaves, few-flowered. *Bractes* three-fold, chaffy, ciliate, two-flowered. *Flowers* remote, small, of a bluish purple. *Legumes* compressed, from two to four-jointed, hairy.

5. H. *gramineum. Willd.* iii. 1172.

Biennial, erect. *Leaves* simple, linear, smooth. *Racemes* terminal, long.

H. *gramineum. Retz. Obs.* v. *N.* 70.

*Beng.* Pan Nutta.

A small perennial woody species, growing generally amongst long grass on dry ground. It flowers during the wet and cold seasons.

*Stem* scarcely any. *Branches* many, sometimes nearly erect, sometimes diffuse, very slender, woody, from one to three feet long. *Leaves* alternate-petioled, linear-lanceolate, smooth, one and a half, or two inches long, and half an inch broad. *Stipules* of the petioles chaffy, semi-lanceolate. *Racemes* terminal, pretty long. *Bractes* three-fold, lanceolate, three-flowered. *Flowers* small, beautifully variegated with red and yellow. *Calyx* four-cleft; *upper division* emarginate; *apex* bearded. *Legumes* erect, sub-cylindric, composed of from three to five, almost round, pretty smooth articulations.

6. H. *bupleurifolium. Willd.* iii. 1171. *Corom. pl.* ii. *N.* 194.

Perennial, diffuse, hairy. *Leaves* linear-lanceolate. *Stipules* chaffy. *Spikes* imbricated with two-flowered bractes. *Calyces* four-leaved; the upper one bidentate. *Legumes* erect, beaked, obliquely jointed.

Difference of soil and situation produces such great changes in this plant as to make a transient examiner imagine he had met with two or more distinct species. In a good soil, and

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shaded by large trees, it grows with an erect, woody stem, to be three or four feet high, with many long straggling branches, resting on the ground; in an exposed poor soil, it is a small diffuse, seemingly annual. In all, the succulent parts are hairy. The flowering time the wet and cold seasons.

*Leaves* remote, alternate, horizontal, petioled, lanceolate, hairy, size various. *Petioles* three-sided. *Stipules* of the petioles chaffy, embracing much of the branch of the leaf, small and subulate. *Spikes* terminal, and leaf-opposed, many-flowered, imbricated with chaffy, hairy, ciliate, ovate, pointed, two-flowered bractes. *Flowers* of a bright red. *Calyx* four-leaved; *upper leaf* emarginate, hairy, the length of the corol. *Legumes* erect, sharp pointed, of from three to five obliquely oval rugose joints.

7. H. *styracifolium. Willd.* iii. 1174.

Shrubby, erect, ramous, every part except the upper surface of the leaves hairy. *Leaves* oblong, emarginate. *Racemes* terminal. *Bractes* solitary, cordate, two-flowered. *Calyx* four-leaved, all entire. *Legumes* straight, thin, of five rugose joints, notched on both sides.

A native of Coromandel; flowering time the close of the rains. Seed ripe in January.

8. H. *glumaceum. Willd.* iii. 1172.

Biennial, diffuse, hairy. *Leaves* lanceolate, clouded. *Racemes* terminal, becoming leaf-opposed. *Bractes* two-flowered. *Calyx* four-leaved, ciliate, the upper one bidentate. *Legume* of from three to four oblique, rugose joints.

A native of the coast of Coromandel; in the Botanic garden at Calcutta it blossoms in the rains, and cold season.

9. H. *triquetrum. Willd.* iii. 1176.

Perennial, diffuse. *Leaves* simple, oblong-cordate; *peti-*



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*oles* winged. *Racemes* terminal. *Legumes* smooth, many-jointed.

The figures of this plant, if intended for it, in the *Herbarium Amboinense*, *Burman's Flora Zeylanica*, and *Flora Indica*, are all bad. It is a native of many parts of India, though not common, so far as I have been able to observe, in any; flowering time the cold season.

*Stems* perennial, many, diffuse, with many bifarious, spreading, coloured, somewhat three-sided, smooth, branches. *Leaves* alternate, petioled, bifarious, ovate-oblong, smooth on both sides and entire. *Petioles* winged. *Stipules* as in the genus. *Racemes* terminal. *Flowers* numerous, three-fold, rose-coloured. *Legumes* of from four to eight joints, and notched on the under side.

10. H. *alatum*. *Roxb.* 1896.

Shrubby, erect, with many erect, from three to four-sided branches. *Leaves* simple, long, linear-cordate. *Petioles* winged. *Racemes* terminal. *Legumes* hairy, thin, from four to six-jointed; *lower margin* crenulate.

H. *triquetrum*. *Burm. Ind. t.* 25. *f.* 2.

A native of Hindoostan. Flowering time the close of the rains. Is allied to H. *triquetrum* on account of the winged petioles only; that is always procumbent, this straight and perfectly erect, and a much more beautiful plant.

*Trunk* short and straight. *Branches* many, erect, the tender shoots, three, or four-angled, from the insertion of the leaves downwards these angles are more villous than the other parts. *Leaves* simple, linear-cordate, entire, smooth on both sides, about four inches long. *Petioles* much shorter than the leaves, winged, which at the upper wing terminate in two recurved points. *Racemes* terminal, and from the extetior axills, erect, from six to twelve inches long. *Flowers* numerous, small, of a violet-colour. *Bractes* three-fold, two-flowered, but between these two flowers there is according to my observations a succession of abortive flowers. *Calyx*

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four-cleft; the *upper division* broad, acute and entire. *Legume* broad, thin, hairy, from four to six-jointed, and crenulate on the lower edge.

11. H. *gangeticum. Willd.* iii. 1175.

Shrubby, oblique. *Leaves* ovate, acute, scabrous above, and villous underneath. *Racemes* terminal, very long and slender. *Flowers* paired. *Carina* and *wings* reflexed. *Legume* from five to six-jointed, straight on the upper margin.

*Sans.* Salpurnee.

*Beng.* Sal pan.

Of this we have two varieties; one with purple, the other with white flowers. They are natives of Coromandel, Bengal, and other parts of India, and in flower most part of the year. Seed ripens in the cold season.

12. H. *collinum. Roxb.* 393.

Shrubby, oblique. *Leaves* ovate-cordate, downy underneath. *Racemes* axillary, very long. *Legume* notched on the under side.

A shrubby species found chiefly amongst the Circar mountains, growing under the shade of trees.

*Leaves* alternate, petioled, cordate, or nearly round, entire, below downy, the longer ones are from five to six inches long, and from four to five broad. *Petioles* about an inch long, half round, downy. *Stipules* of the petioles cordate, acute; those of the leaves subulate. *Racemes* axillary, and terminal, two, three, or four times longer than the leaves, filiform, erect, hairy, bearing many small, bright violet-coloured flowers. *Legumes* erect, compressed, from four to six-jointed, pretty smooth.

Allied to H. *gangeticum*, and *latifolium*; from the former it differs in bearing axillary racemes and ovate cordate leaves. And from the latter in the leaves being pointed, not near so broad in proportion to their length, and not repand as in that species.

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13. H. *latifolium. Roxb.*

Shrubby, oblique. *Leaf* simple, round reniform-cordate, somewhat repand. *Stipules* semi-cordate, cuspidate. *Racemes* axillary, clothed with hooked bristles; *legumes* from three to five-jointed, notched on the under margin.

A native of the northern parts of Hindoosthan. Colonel Hardwicke brought the seeds to the Botanic garden, where the plants blossom during the rains.

*Stem* short, ligneous, and pretty smooth. *Branches* oblique, almost horizontal, or reclinate, the slender parts villous. *Leaves* alternate, bifarious, short-petioled, roundish cordate, downy underneath, scabrous above, about three or four inches long, and nearly of the same breadth. *Stipules* of the petioles semi-cordate, and cuspidate; those of the leaves subulate. *Racemes* axillary, and terminal, horizontal, many times longer than the leaves, clothed with small hooked bristles. *Flowers* three-fold, the middle one last and they are small and of a bright purple colour. *Bractes* three-fold, triangular, acute. *Legumes* flat, clothed with hooked bristles, four or five-jointed, and more deeply notched on the under margin.

14. H. *strobiliferum. Willd.* iii. 1176.

Shrubby. *Leaves* simple, ovate. *Racemes* terminal, imbricated laterally with reniform folded inflated bractes inclosing the fasciculi of flowers.

An elegant pretty large shrub, a native of various parts of India. Flowering time the cold season.

*Root* ramous. *Trunk* short, woody, covered with smooth, ash-coloured bark. *Branches* numerous, with their extremities waving, and when in blossom drooping. *Leaves* simple, alternate, bifarious, short-petioled, ovate, acute, acuminate, entire, with numerous, large, and parallel veins, smooth on both sides, various in size, the larger ones from three to six inches long, and about half as much in breadth. *Stipules* small, caducous. *Racemes* terminal, drooping, imbricated on the two sides with alternate, bifarious, reniform, when forcibly ex-

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panded, for in their natural folded state the shape is semi-reniform, folded, inflated, nervous, scarious, large bractes; each concealing in its duplicature a small fascicle, or more, of peduncled, pure white, middle-sized flowers. *Legume* of one joint with one or two small reniform maculated seeds.

15. H. *bracteatum. Roxb.*

Shrubby, erect; *leaves* narrow-cordate. *Racemes* terminal, compound, bifariously imbricated with alternate, reniform, inflated, downy, bractes. *Legume* of one oval joint, two-seeded.

A native of the interior parts of Bengal; from Dinajpoor Dr. W. Carey sent the seeds to the Botanic garden at Calcutta, where the plants thrive luxuriantly, and begin to blossom during the cold season.

*Stems* several, shrubby, erect, a few branches from their upper parts. *Tender parts* somewhat angular and soft, with very fine down, height of the four-year-old plants about three or four feet. *Leaves* bifarious, alternate, very short petioled, narrow-cordate, entire, smooth above, about three inches long, by one, and one and a half broad. *Stipules* chaffy, ensiform, permanent. *Racemes* terminal, or from the exterior axills, drooping, compound, or even decompound. *Ramifications* thereof bifarious, alternate, very downy. *Bractes* folded, &c. as in H. *strobiliferum*, but in this species they are soft with much down. *Exterior bractes* ensiform, ciliate, and placed like stipulæ one on each side of the insertion of the large folded bractes. *Flowers* minute; *racemes* within and hid by the folded bractes except for a few hours when in vigorous blossom the bractes open a little, they are small, rose-coloured. *Legumes* small, hid within the scariose bractes, of one oval joint, villous, one or two-seeded, two is most common.

16. H. *gyrans. Willd.* iii. 1186.

Suffruticose, erect, twiggy. *Leaflets* lanceolate, the lateral

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minute, one or both often wanting. *Racemes* terminal and axillary. *Legume* hispid, six-jointed.

*Beng.* Gora-chand.

A native of Bengal. Flowering time the cold season.

*Root* ramous. *Stem* erect, with a few twiggy, smooth branches; the whole height from three to four feet. *Leaves* alternate, simple and ternate. *Leaflets* lanceolate, obtuse at both ends, smooth and entire, the exterior one much larger; the lateral ones are sometimes wanting. *Petioles* half-round, with a few hairs over them. *Stipules* tapering to a fine point. *Racemes* terminal and axillary, hispid. *Bractes* cordate, concave, two-flowered. *Flowers* pretty large, of a pale yellow, with a little blue in the wings. *Calyx* membranaceous five-toothed. *Filaments* alternately short and broad, longer and filiform. *Anthers* roundish. *Stigma* two-parted. *Legume* crenulate on the upper margin, very hispid, from six to eight-jointed.

The wonderful rotatory motion of the small lateral leaflets of this plant, has already been taken notice of in various publications: it is unnecessary to repeat, what is now well known.

17. H. *vispertilionis. Willd.* iii. 1177.

Annual and biennial, straight. *Leaves* ternate, and simple, highly coloured; lateral leaflets sub-triangular, exterior, large and transversely crescent-shaped, terminal. *Legumes* from four to six-jointed, folded up in the inflated calyx.

*Beng.* Chamchicka.

An uncommon looking, pretty plant, a native of various parts of India, in flower and seed the whole year.

18. H. *sororium. Willd.* iii. 1170.

Herbaceous, procumbent, smooth, three-sided. *Leaves* subsimple, orbicular, emarginate, smooth. *Racemes* axillary. *Legumes* semi-oval, one-seeded.

*Teling.* Nalla-sora-cada.

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A native of naked sandy pasture ground. Flowers during the wet and cold seasons.

*Root* simple, long, slender, biennial or triennial. *Stem* none. *Branches* numerous, simple, spreading close over the ground to a great extent, somewhat from eight to ten feet each way, slender, smooth, three-sided. *Leaves* remote, alternate, petioled, orbicular, emarginate, smooth, often clouded, those near the root simple, further they have often a minute, lanceolate leaflet or two, (called bractes in the *Mantissa,)* as in H. *gyrans*. *Stipules* of the petioles semi-lanceolate, chaffy; those of the leaves, or leaflets minute. *Racemes* axillary, longer than the leaves, few-flowered. *Bractes* concave, few-flowered. *Legumes* boat-shaped, pointed, smooth, always one-jointed and one-seeded.

SECT. II. *Leaves conjugate.*

19. H. *diphyllum. Willd.* iii. 1178.

Herbaceous, cespitose. *Leaves* binate; *leaflets* lanceolate. *Stipules* lanceolar.

Nelam mari. *Rheed. Mal.* ix. *t.* 82.

The leaflets in Burman's figure are much too broad and short for the sort on the continent of India, and I think Willdenow must be right in considering it a distinct species. Our plant is common on poor sandy pasture land, in many parts of India.

SECT. III. *Leaves ternate.*

20. H. *triflorum. Willd.* iii. 1202.

Perennial, creeping. *Leaves* ternate. *Leaflets* obcordate. *Flowers* peduncled, from three to six, opposite to the leaves. *Legumes* falcate, from four to five-jointed, notched on the under side.

*Beng.* Kodalia.

H. *trifoliatum* repens, &c. *Burm. Zeyl.* vi. 54. *f.* 2.

*Teling.* Moonoodda-Mondoo.



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Very common on pasture ground and helps to form the most beautiful turf we have in India.

*Root* woody, perennial. *Stem* and *branches* creeping, alternate, bifarious, slender, a little hairy, in some soils very much so. *Leaves* ternate. *Leaflets* obcordate, small. *Stipules* cordate, and partly attached to the petiole. *Flowers* leaf-opposed, from three to six peduncled, of a beautiful bright blue. *Style* swelled at the angle. *Legumes* from three to six-jointed, curved a little, the seed-bearing margin straight, the other notched. Cattle are very fond of it.

It is probable that Burman's plant, also his H. *Stipulaceum. Burm. Flor. Ind. p.* 168. *t.* 54. *f.* 2. and this plant, are the same, for in this species there are besides these stipules of the petioles, others within at the base of the branchlets, but the peduncles being numerous, and opposite to the leaves, is a strong specific difference.

The natives apply the fresh plant bruised to wounds that do not heal well.

21. H. *reptans. Roxb.*

Perennial, cespitose, hairy. *Leaflets* oval. *Peduncles* leaf-opposed, three or four-flowered. *Legume* from four to six-jointed.

Hedysarum trifoliatum. *Burm. Zeyl.* 118. *t.* 54. *f.* 1.

This figure has already been quoted by various authors for a variety of *Hedysarum triflorum*, while the shape of the leaves, and the solitary, often more than one-flowered, peduncles in this plant clearly evince their being distinct species, besides this is a much more robust plant than *triflorum*. My plant is a native of the interior parts of Bengal, and from thence was introduced into the Botanic garden at Calcutta by Dr. W. Carey; flowering time the rainy season.

*Root* perennial. *Stem* scarcely any thing that can be so called but many perennial branches creeping, even to their very apices, perfectly flat on the earth and striking root at the joints. *Branchlets* alternate, all slender, and very hairy, the

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largest from one to two feet long. *Leaves* petioled, ternate. *Leaflets* oval, entire, pretty smooth, and of a paler green in the centre. *Peduncle* solitary, opposite to the leaves and about their length, each supporting three, four, or five small white flowers on long slender pedicels. *Legume* of from three to six joints.

22. H. *quinquangulatum. Roxb.*

Herbaceous, diffuse, five-sided, hispid. *Leaves* ternate; *leaflets* oval, downy. *Stipules* cordate. *Racemes* numerous. *Flowers* paired. *Legumes* hispid, six-jointed, notched on both margins.

Compare with H. *diffusum. Willd.* iii. 1180.

This is a large, luxuriant, diffuse, perennial species, a native of strong rich moist pasture lands, such as the borders of rice fields. Flowering time the wet and cold seasons.

*Root* woody, ramous. *Stem* no other than many ramous, hispid, five-sided, diffuse branches, two, three, or four feet long. *Leaves* ternate, petioled, nearly bifarious. *Leaflets* oval, emarginate or obtuse, downy, about one inch and a half long and one broad. *Petioles* as long as the leaflets, channelled. *Stipules* of the petioles cordate, acute; those of the leaflets lanceolate, large. *Racemes* terminal, and axillary, frequently compound. *Bractes* three-fold, two-flowered. *Flowers* numerous, small, blue. *Legumes* compressed, from five to seven-jointed, covered on both margins with hispid, hooked hairs, which make them adhere to every thing that touches them.

Cattle eat this species greedily and as it grows quickly, and with luxuriance, it might be cultivated to advantage.

23. H. *articulatum. Roxb.*

Annual, creeping; *branches* five-sided. *Leaves* ternate; *leaflets* ovate. *Stipules* ear-shaped, stem-clasping. *Racemes* terminal and axillary, harsh with hooked hairs, often compound. *Legume* from four to five-jointed.



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A native of the interior parts of Bengal. The flowering time the close of the rains; the seeds ripen during the cold season, soon after which the whole plant perishes.

*Stem* none, but several, stout, sub-ligneous branches from three to six feet long spreading close on the ground, and striking root. *Branchlets* alternate, bifarious, five-sided, villous, scabrous with small hooked hairs. *Leaves* alternate, bifarious, ternate. *Leaflets* ovate, obtuse, villous, and somewhat scabrous on both sides; from one to three inches long, and broad in proportion. *Stipules* of the petioles ear-shaped, stem-clasping; those of the leaflets lanceolate. *Racemes* axillary and terminal, very often so compound as to form large, bifarious panicles. *Peduncles* and *pedicels* angular, and armed with harsh hooked hairs. *Bractes* of the ramifications like the stipules of the flowers, or extreme divisions, ovate, ciliate, two or three-flowered. *Flowers* minute, very numerous, slender, pedicelled, pink coloured. *Legumes* linear, a little curved, from four to six-jointed, notched on the under side, armed with a few hooked hairs, which makes them adhere readily to any thing that touches them.

Cattle are fond of the green plant, and as it is one of the most luxuriant of the genus, I have met with, it might be advantageously cultivated for fodder in India.

It comes very near my *Hedysarum quinquangulatum*, No. 398; but differs specifically in the stipules and shape of the leaflets, independent of their duration.

24. H. *vescidum. Burm. Ind.* 167. *&c. B. H.*

Perennial, creeping, hairy. *Leaflets* roundish, downy. *Stipules* subulate. *Racemes* terminal. *Flowers* three-fold. *Legumes* from four to five-jointed, notched on the underside, and covered with hooked hairs.

A creeping, perennial species, growing under the cover of bushes, in a dry, gravelly soil. It flowers during the wet and cold seasons.

*Root* woody. *Stems* or rather *branches* several, prostrate,

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rooting at the joints, slender, two feet long; *young parts* covered with short hairs. *Leaves* alternate; *exterior leaflets* rhombiform, from one to two inches each way, the pair smaller, obliquely obovate, all are entire and downy, particularly on the under side. *Stipules* awled, withering. *Racemes* terminal, with generally a smaller one from the exterior axill, long, erect, hairy. *Bractes* three-fold, three-flowered. *Flowers* small, of a deep purple, the middle one of the three is generally abortive. *Calyx* four-parted. *Legumes* compressed, obliquely truncate with a bristle, from three to four-jointed, notched on the under side, closely covered with many stiff, hooked hairs, which makes them adhere to every thing that touches them.

25. B. *diffusum. Roxb.*

Shrubby, diffuse. *Leaflets* oblong, ventricose. *Racemes* terminal, long, and slender, with rather remote fascicles of flowers. *Legumes* linear, from five to six-jointed, armed with hooked bristles.

A native of the interior parts of Bengal, and from thence introduced into the Company's Botanic garden by Dr. W. Carey. Flowering time the latter part of the rainy season.

*Stems* and *branches* diffuse, ligneous, but slender and variously bent. *Bark* smooth, of dark brownish green; *young shoots* covered with a few depressed harsh hairs; the length of the longer branches many feet. *Leaves* alternate, generally ternate, though sometimes simple; when so, they are cordate; when turned the leaflets are elliptic, or ovate-oblong, all are entire and pretty smooth on both sides. *Stipules* of the petioles taper, triangular; those of the leaflets ensiform. *Racemes* terminal towards the base, ramous, long, slender and villous. *Flowers* numerous, small, of a bright blue colour, collected in rather remote fasciculi, and blossoming in succession. *Bractes* ensiform, one at the base of each pedicel. *Legumes* linear, from five to six-jointed, covered with many

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short, hooked bristles by which they adhere readily and firmly to every thing that touches them.

26. H. *recurvatum. Roxb.*

Shrubby with recurved branches. *Leaves* bifarious. *Leaflets* ovate. *Racemes* axillary and terminal, drooping long before the flowers expand. *Bractes* many-flowered. *Legumes* linear, compressed, ramous, bristly, from six to seven-jointed.

A native of the interior parts of India, and introduced into the Botanic garden by Captain Hardwicke from Cawnpore. It flowers during the rains, and ripens its seed in the cool season.

*Trunk* (in our young plant) short but ligneous, with the branches bending to one side and their extremities recurved, the under parts clothed with short depressed hairs. *Leaves* bifarious, ternate. *Leaflets* ovate and oval, entire, rather acute, somewhat pubescent. *Petioles* channelled. *Stipules* of the petioles chaffy, taper-pointed, large; those of the leaflets subulate. *Racemes* axillary and terminal, before the flowers expand they point directly to the earth, afterwards they become very long, from one to two feet. *Bractes*, the exterior one single, broad-lanceolate, embracing several smaller with a succession of small violet-coloured flowers. *Calyx* four-cleft; the *upper division* broader but entire. *Banner* nearly white. *Wings* and *apex* of the keel blue. *Legumes* long, slender, compressed, clothed with hamous bristles by which they readily adhere to any thing they touch, both margins nearly even. *Joints* long, six or eight.

27. H. *purpureum. Roxb.*

Perennial, diffuse; *leaflets* oval, clouded. *Racemes* terminal, before expansion strobiliform. *Legumes* six-seeded, notched on the under side.

Reared from seeds received from Dr. Carey, who gather-

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ed them on the northern frontier of Bengal. Flowering time the rainy season.

*Stem* short, nearly straight, with numerous longer branches from its base, spreading close on the ground and striking root at the joints; all are round and while young covered with short depressed white hairs. *Leaves* ternate. *Leaflets* exactly oval, entire, pretty smooth, of a darker colour on the upper surface, and often stained. *Petioles* channelled. *Stipules* of the petioles, from broad bases, tapering to a long daggered point; those of the leaflets awled. *Racemes* terminal, solitary, hairy, before the flowers expand, imbricated with numerous, two-flowered, broad-based, dagger-pointed, ciliate bractes. *Flowers* large, very numerous, of a beautiful deep bright blue purple. *Calyx* smooth, four-parted; the *upper division* two-toothed. *Corol*, keel with two horns, not unlike those of *Indigofera.* However the general habit of the plant, besides the articulated legume, clearly points it out as a *hedysarum.* *Legume* of five or six orbicular joints, straight on the upper edge, and notched on the lower, hairy, particularly the margins.

28. H. *biarticulatum. Willd.* iii. 1183.

Shrubby, slender. *Leaves* ternate; *leaflets* oblong, smooth; *racemes* terminal. *Legumes* with one or two joints.

H. *triphyllum. Burm. Zeyl. t.* 5. *f.* 2.

*Teling.* Nilla Kavani.

A small diffuse perennial or shrubby species, a native of dry sandy ground. Flowering time the wet and cold seasons.

*Root* woody, simple, descending to a great depth. *Stem* very trifling, and soon dividing into many ramous, diffuse, slender, smooth, purple branches. *Leaves* alternate, ternate. *Leaflets* nearly equal, oblong, smooth, about half an inch long and a quarter broad. *Stipules* of the petioles chaffy, embracing the branchlet, apices torn. *Racemes* terminal, many-flowered. *Bractes* three-fold, many-flowered. *Flowers*

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small, of a beautiful bright red. *Legumes* from one to two-jointed. *Joints* compressed, orbicular.

29. H. *umbellatum. Willd.* iii. 1182.

Sub-arboreous. *Leaflets* oblong, smooth, umbelled. *Legumes* from four to six-jointed, notched on one side.

H. *trifolium arboreum. Burm. Zeyl. t.* 51.

*Teling.* Chetenta.

A native of moist rocky valleys, where it grows to be a small tree, with smooth, green bark. It flowers during the hot season.

*Branchlets* twiggy, flexuose, somewhat three-sided. *Young shoots* a little downy. *Leaves* alternate, petioled, spreading, ternate. *Leaflets* oblong, pointed, smooth, entire, from two to three inches long, and one or one and a half broad. *Stipules* of the petioles short, cordate, chaffy; those of the leaflets subulate. *Umbels* simple, axillary, peduncled, globular, erect. *Peduncles* one-third the length of the petioles. *Legumes* from three to six-jointed, compressed, pretty smooth, a little recurved, notched on the upper margin.

30. H. *Cephalotes. R.*

Sub-arboreous, all the tender parts woolly. *Leaflets* oblong, ventricose, marked with many woolly, simple, parallel veins underneath. *Flowers* crowded on short-peduncled, axillary heads. *Legumes* flat, villous, incurved, from two to three-jointed.

A native of the interior parts of Bengal, and from thence introduced by Dr. W. Carey into the Botanic garden where it is in blossom most part of the year; the seed ripens during the cold season.

*Stem* ligneous, erect, often as thick as a man's leg. *Branches* spreading, with numerous, alternate, bifarious, three-sided, downy branchlets. *Leaves* alternate, bifarious, ternate. *Leaflets* elliptic, while young clothed with much, very soft, woolly hair, with numerous, parallel, woolly veins under-

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neath, and the margins entire and woolly, from two to four inches long, and from one to two broad. *Petioles* deeply channelled and woolly, from one to two inches long. *Stipules* of the petioles ensiform, woolly on the outside, caducous, those of the leaflets filiform and also woolly. *Peduncles* axillary, generally solitary, woolly, scarcely one-third or one-fourth the length of the petioles, crowned with a simple, small head of small short-pedicelled white flowers. *Bractes* of the peduncles two at the base of the pedicels, solitary, one-flowered, those of the flowers opposite, pressing on the calyx laterally, all are clothed with soft woolly hairs and are like the stipules, though much smaller. *Calyx* woolly on the outside, four-cleft; the *upper segment* broad. *Legumes* flat, incurved, villous, two or three-jointed.

31. H. *arboreum. R.*

Arboreous. *Leaflets* nearly round and smooth, with simple and parallel veins. *Stipules* solitary, spathiform, bidentate. *Heads* axillary, short-peduncled. *Legume* of one or two long, curved, fleshy joints.

A native of the Moluccas.

32. H. *pulchellum. Willd.* iii. 1179.

Shrubby, erect. *Leaflets* ovate-oblong. *Racemes* axillary and terminal, much longer than the leaves. *Bractes* paired, sub-orbicular, many-flowered. *Legumes* two-jointed.

H. *triplicatum* frutescens, &c. *Burm. Zeyl. t.* 52. good. *Beng.* Juta Salpani.

A most elegant shrubby species, common in many parts of India, particularly the mountains; flowering time the rainy season.

*Stem* erect; *branches* spreading to one side with bifarious alternate branchlets, the bark of a dark rust colour. *Leaves* alternate, bifarious, alternate-ternate, expanding, short-petioled. *Leaflets* ovate-oblong, lineate; smooth above, a little hairy underneath. *Stipules* daggered, with long bristly points. *Ra-*



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*cemes* axillary and terminal, of various lengths, the largest from two to three times longer than the leaves, with extremities drooping. *Bractes* alternate, bifarious, approximate, short-petioled, paired, sub-orbicular, with petioles ending in a long terminal bristle between them. *Flowers* crowded, expanding in succession, small, of a pale cream colour, and yellowish with age. *Calyx, upper lip* entire, the under one of an equal division. *Legumes* two-jointed, and completely hidden by the bractes.

33. H. *patens. Roxb.*

Perennial, diffuse. *Leaflets* oblong. *Racemes* terminal. *Bractes* three-fold, one-flowered. *Legume* from five to six-jointed, notched underneath, hamose, bristled.

A native of the Moluccas. In the Botanic garden at Calcutta it blossoms most part of the year.

*Stem* none, but several branches springing from the crown of a ligneous root, spreading over the ground to the distance of some feet, round, ligneous, villous, and coloured. *Leaves* alternate, bifarious, ternate, rarely single, and then near the root only. *Leaflets*, the pair smaller, ovate, and ovate-oblong, the terminal one nearly elliptic, or oval, all are obtuse, and pretty smooth, from one to two inches long. *Petioles* villous, shorter than the leaves, and channelled. *Stipules* of the petioles stem-clasping, chaffy, acute; those of the leaflets subulate. *Racemes* terminal, solitary, simple, few-flowered. *Bractes* three-fold, one-flowered; the lateral pair very small. *Flowers* small, purple. *Calyx* four-cleft; upper division broader, and bidentate. *Legumes* five or six-jointed, clothed with numerous hooked bristles; the *under margin* deeply notched.

34. H. *Junceum. Willd.* iii. *p.* 1194.

Herbaceous; *twigs* long, and straight; *leaflets* cuneate. *Flowers* axillary. *Legume* one or two-seeded, the length of the segments of the calyx.

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A native of Nepal, from thence Dr. Buchanan sent the seeds to the Botanic garden, under the name *Anthyllis cuneata*, where the plants grow freely, and blossom during the rains and cold season.

*Root* perennial. *Stem* erect, short, as they soon divide into long, simple, straight, or drooping, slender, villous twigs; they are all herbaceous. *Leaves* ternate while the plants are young, tending to be torn and often perfectly so; *leaflets* cuneate, villous, scarcely half an inch long, and less than a quarter of an inch in breadth. *Petioles* three-sided, villous. *Stipules* chaffy, ensiform, petiolar. *Peduncles* axillary, very short, few-flowered. *Flowers* small, of a pale yellow. *Bractes* minute, some embracing the insertions of the pedicels, and two large ones the calyx. *Calyx* four-cleft; *division* slender and acute, the upper one broader and two-toothed. *Banner* roundish, with a two-lobed, purple spot in the middle. *Stamina* one and nine. *Legume* scarce the length of the calyx, oval, one or two-seeded.

35. H. *tuberosum. Willd.* iii. 1197.

Shrubby, twining; *leaflets* downy. *Racemes* long; *flowers* three-fold. *Legume* hairy, pendulous, four-jointed; contracted at the joints.

Kadsumi. *Banks' Icon. Kæmpf. tab.* 25.

*Teling.* Daree, Goomodee.

A rare species, a native of the valleys far up amongst the mountains. It flowers during the hot season, at which time it is perfectly naked of leaves, being deciduous about the beginning of the cold season.

*Root* tuberous, very large. I think one of the largest I ever saw. *Stems* twining, woody, running over high trees, &c. *Leaves* alternate, petioled, ternate. *Leaflets* roundish, pointed, entire, downy, from six to twelve inches each way. *Petioles* channelled, from six to twelve inches long. *Stipules* of the petioles cordate, those of the leaflets subulate. *Racemes* simple or branchy, as long as the leaves, from tuberosities caused



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by the cicatrices of the old leaves, erect, round, smooth. *Flowers* numerous, three-fold, pretty large, blue. *Legumes* from two to six-jointed, pendulous, compressed, pointed, much contracted at the joints, very hairy.

The root peeled and bruised into a cataplasm is employed by the natives of the mountains where it grows to reduce swellings of the joints.

SECT. IV. *Leaves pinnate.*

36. H. *sennoides. Willd.* iii. 1207.

Shrubby. *Leaves* pinnate; *leaflets* alternate, from four to six-paired, obovate. *Peduncles* axillary, nodding, few-flowered. *Legumes* pendulous. *Joints* from three to four, echinate.

*Teling.* Nall Kashina.

Russelia of König.

A pretty large ramous shrub, a native of forests, hedges, uncultivated lands, &c. It flowers during the rains.

*Stem* woody, short, irregular. *Bark* dark-coloured. *Branches* numerous, irregular; *young shoots, petioles, peduncles, pedicels* and *calyx*, covered with a soft kind of glutinous hair, the gluten is of a bright gold colour, and is frequently seen in small, beautiful, distinct, globules at the extremities of the hairs. *Leaves* alternate, pinnate, with an odd one, about two inches long. *Leaflets* alternate, from four to six pair, obovate, a little pointed, smooth, entire. *Stipules* of the petioles chaffy. *Racemes* axillary, short, bowing, from three to six-flowered. *Flowers* pretty large, yellow, bowing. *Legumes* pendulous, compressed, from two to five-jointed, much contracted at the joints, muricate, glutinous.

Dr. König made a new genus of this and called it after Dr. Patrick Russell, without knowing that another genus has been named after his brother the late Dr. A. Russell.

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37. H. *lagenarium. R.*

Perennial, floating, spongy, leaflets numerous. *Stipules* lanceolar, adjoined. *Peduncles* about two-flowered, joints of the legume from four to six, scabrous in the middle.

Aeschynomene lagenaria. *Lour. Cochin Ch.* 446.

Aeschynomene *aspera. Willd.* iii. 1163.

*Hind.* and *Beng.* Shola and Phool shola.

*Teling.* Neerjeelooza.

Common on the borders of lakes of sweet water in most parts of India. Flowering time the rainy and cool seasons. The larger plants are particularly light, white and spongy; they are gathered during the dry months of April and May, and converted by the natives of Bengal into a great variety of toys, floats for fishing nets, gentlemen's hats, &c.

38. H. *Neli-tali. R.*

Herbaceous, diffuse and scabrous. *Leaflets* numerous, minute. *Stipules* lanceolar, adjoined. *Legumes* from six to ten-jointed, smooth on both sides.

Neli-tali. *Rheed. Mal.* ix. *t.* 18.

*Teling.* Tiga jeelooga.

Aeschynomene *Indica. Willd.* iii. *p.* 1164.

Found on moist pasture ground, during the rainy season.

## *DOODIA. R.*[*]

*Calyx* bilabiate; *upper lip* bifid; *under* tripartite, in the mature state resupine, by the incurvation of the upper end of the pedicel. *Loment* moniliform, composed of from two to six sub-globular, one-seeded joints, slenderly connected and compactly folded up within the subulate hairy segments of the calyx.

The plants which fall under the above character have the

* In memory of Mr. Samuel Doody, an eminent Botanist, the friend and cotemporary of Ray, Plukenet, and Sloane.

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general habit of *Hedysarum*, viz. perennial, for the most part shrubby, their tender parts armed with diverging harsh hooked bristles.

*Leaves* simple, ternate or equally pinnate and stipulate. *Racemes* terminal, before expansion imbricated with two-flowered dagger pointed bractes. *Flowers* of a middling size, and rosy, pedicels pretty long, and what is a strong characteristic mark of the genus they become rigidly incurved soon after the flowers decay, pressing the folded loments forcibly in against the rachis. *Corol* as in the generality of papilionaceous plants. *Filaments* single and nine-cleft. *Anthers* equal, oval. *Germ* sub-moniliform. *Style* clavate. *Stigma* capitate. *Loments* composed of from two to six roundish, one-seeded joints, united by slender isthmuses which admit of their being very perfectly folded up within the segments of the calyx. *Embryo* curved, furnished with a thin perisperm.

1. D. *simplicifolia. R.*

Shrubby. *Leaves* simple, ovate, oblong, lineate, villous underneath, scabrous above. *Racemes* terminal, panicled. *Loments* of several joints.

A native of Chittagong where it flowers in October and November.

2. D. *lagopodioides. R.*

Perennial, prostrate. *Leaves* ternate, and single. *Racemes* oblong, dense. *Legumes* two-jointed.

*Beng.* Goluk-chakuli.

A native of the coast of Coromandel as well as of Bengal; flowering in the rainy season.

*Stems* several, slender, perennial, prostrate, and rooting at the joints, round, covered with short scabrous hairs. *Leaves* alternate, ternate, and simple. *Leaflets* roundish, emarginate, both sides covered with short scabrous hairs; the largest about two inches each way. *Stipules* subulate, those of the

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petiole having a broad base. *Racemes* solitary, terminal, peduncled; at first conical, afterwards cylindric, very hairy. *Bractes* oblong, acute, concave, hairy. *Pedicels* uniting at the base, and one very hairy, after flowering time incurved. *Flowers* numerous, rose-coloured. *Calyx* very hairy, the lower three divisions very long, and still more hairy. The *legumes* generally consist of two, oval, smooth joints folded together, connected by a slender isthmus, and bent in against the rachis, by the incurvature of the pedicel, after the flowers decay.

3. D. *hamosa. R.*

Shrubby, diffuse. *Leaves* simple, and ternate, sub-rotund, villous. *Racemes* axillary and terminal, before expansion strobiliform. *Legumes* from two to four-jointed.

A native of the interior parts of Bengal. Flowering time, the end of the rains.

*Stem* scarcely any, but numerous, diffuse, variously bent, straggling, or creeping, woody branches; *young shoots* and *racemes* armed with shorter hooked bristles, intermixed with longer straight hairs. *Leaves* from simple to ternate. *Leaflets* from round to obcordate, emarginate, downy underneath, from one to two inches long. *Stipules* of the petioles taper, long, and subulate from a broad, semi-cordate base; those of the leaflets filiform, all are hairy. *Racemes* axillary and terminal, before the flowers appear strobiliform, but stretching out a great length by the time the seed is ripe. *Bractes* alternate, two-flowered, ovate, concave, with a long subulate point, ciliate, and hairy, one-flowered, after the flowers decay they become rigidly incurved, pressing the legume against the rachis of the racemes, making what was the under division of the calyx the upper. *Flowers* numerous, pretty large, of a pale rose-colour, in the morning changing to lilac. *Calyx* very hairy. *Legume* of two, three, or four round joints, united by slender pedicels.

Excepting the racemes and size of the plant, this species is

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very much like *lagopodioides*, and if I had not both growing before me at the same time, it might be difficult to find out wherein they differ specifically. The lengthening raceme is one of the most conspicuous marks.

4. D. *alopecuroides. Roxb.*

Perennial, diffuse, the tender parts clothed with small hooked bristles. *Leaves* ternate; *leaflets* oval, obtuse. *Racemes* imbricated, and resembling a fox's tail from the hairiness of the calyx, bractes, and incurved pedicels, which bend the two-jointed legumes in against the rachis; the *upper lip* of the calyx minute, and two-toothed.

A native of the northern parts of India, from thence Colonel Hardwicke sent the plant to the Botanic garden where it grows freely, and blossoms during the rains.

*Stem* none, but several, spreading, perennial, branches with ascending extremities, clothed with short, hooked bristles. *Leaves* scattered, petioled, ternate; *leaflets* ovate, obtuse, entire, clouded, both sides clothed with the same short hooked bristles; from two to four inches long, and rather more than half of that in breadth. *Petioles* channelled, harsh, with hooked bristles. *Stipules* ending in a long, subulate hairy point from a broader, ciliate base. *Racemes* terminal, imbricated before the flowers expand, strobiliform, ever after cylindric and more like a fox's tail than those of any other species I have yet seen. *Bractes* approximate, round-cordate, cuspidate, ciliate, two-flowered. *Pedicels* one-flowered, hairy, after the flowers droop, incurved. *Flowers* numerous, rose-coloured. *Calyx* bilabiate. The lower three divisions long, filiform, and very hairy; the upper two very short. *Legume* two-jointed, folded together in the bottom of the calyx.

5. D. *picta. R.*

Shrubby, erect. *Leaves* simple and pinnate; *leaflets* linear.

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*Racemes* terminal, lengthening, flowers paired. *Loments* from three to five-jointed.

Hedysarum pictum. *Willd.* iii. 1204.

*Hind.* Dabra.

*Beng.* Sunkur-juta.

A native of the shady banks of water courses, &c. Flowers during the rains.

*Stem* erect, shrubby, branchy, from three to four feet high. *Leaves* alternate, petioled, from simple to pinnate. *Leaflets* the lower or single are generally oblong-ovate, two to three inches long, and one and a half broad, the leaflets of the compound leaves are linear-lanceolate, all are obtuse, entire, and beautifully clouded on the upper surface with dark brownish purple, below a little reticulated and downy. *Racemes* terminal, erect, rigid, cylindric, hairy. *Bractes* of the peduncles chaffy, permanent; those of the flowers lanceolate, two-flowered, falling. *Flowers* numerous, small, red. *Pedicels* incurved after the flowering time. *Calyx*, apices of the divisions incurved and bearded. *Legume* consisting of from three to six oval joints, connected by a slender isthmus, the incurved form of the pedicels presses them so much against the rachis, that the form is with difficulty observed, till forcibly extended.

6. D. *crinita. R.*

Shrubby, diffuse, densely clothed with short hamose bristles. *Leaves* pinnate; *leaflets* five, linear-oblong. *Racemes* terminal. *Bractes* lanceolate, ciliate, two-flowered. *Pedicels* and *calyces* most hairy. *Legume* three or four-jointed, and pressed together against the rachis.

Hedysarum crinitum. *Willd.* iii. 1218. *Lour. Cochin Ch.* 451. *Fl. Ind. t.* 56.

A native of Chittagong, differing from *picta* in being a lower, and more diffuse plant, with broader leaves, never variegated, and the bractes and calyx much more hairy.

*Stem* trifling, but several, spreading, or leaning branches,



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the lower resting on the ground; *tender shoots* round and armed with innumerable hamose bristles. *Leaves* unequally pinnate, horizontal. *Leaflets* two pair with a terminal one, linear-oblong, entire, of a firm texture, rather lucid above, and reticulated underneath; about three inches long. *Petioles* round, and armed like the other tender parts. *Stipules* scariose, broad-based, long taper-pointed, caducous; those of the leaflets similar, but smaller. *Racemes* terminal, sessile, often several together, their base imbricated with many, broad-based, tapering, ciliate, permanent bractes. *Bractes* of the raceme solitary, lanceolate, two-flowered, caducous. *Pedicels* longer than the flowers, very hairy, becoming incurved when the corol drops. *Flowers* numerous, rose-coloured, pretty large. *Calyx* five-cleft; *division* subulate, the upper two when in blossom, for in seed they become the undermost, rather small, all are very hairy.

*INDIGOFERA. Schreb. gen. N.* 1205.

*Corol* with an awl-shaped spreading spur on each side of the keel.

1. I. *linifolia. Willd.* iii. 1220. *Corom. pl.* ii. *N.* 196.

Perennial, cespitose. *Leaves* simple. *Legumes* globular, seeded.

Hedysarum *linifolium. Linn. Suppl.* 331.

*Beng.* Bhangra.

Common amongst grass all over India; it is probably the smallest of the genus. In Bengal there are two varieties; one with red, the other white flowers.

2. I. *echinata. Willd.* ii. 1222.

*Stems* prostrate. *Leaves* simple, obovate, dotted. *Racemes* axillary. *Legumes* crescent-shaped, with hooked bristles on the convex side, one-seeded.

Hedysarum *rotundifolium. Vahl. Symb.* ii. *p.* 81.

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*Teling.* Nalla-paleroo.

Onobrychis minor monophyllus madraspatana. *Pluk. Alm.* 160. *t.* 433. *Fig.* 1.

Hedysarum *numularifolium. B. H.*

A native of moist borders of rice fields. It flowers during the wet season.

*Root* perennial, ramous. *Stem* no other than many ramous, prostrate, angular, smooth, coloured, from one to three feet long branches, sometimes striking root. *Leaves* simple, alternate, bifarious, sub-sessile, orbicular, or broad-oval, a very little hairy, marked with many, small, glandular pits. *Stipules* subulate. *Racemes* axillary, short-peduncled, about as long as the leaves, from six to eight-flowered. *Flowers* small, red. *Keel* pointed, daggers obtuse. *Legumes* horizontal, moon-formed, beaked, covered with inoffensive, hooked prickles, one-seeded.

3. I. *aspalathifolia. Roxb.*

Shrubby. *Leaves* fascicled, wedge-shaped, smooth. *Peduncles* axillary, solitary, one-flowered. *Legumes* straight.

Manneli. *Rheed. Mal.* ix. *t.* 37.

Aspalathus *Indica. Linn.*

A small, branchy shrub, common on dry sandy lands near the sea. Flowers during the rainy and cold seasons.

*Stem* short, small. *Branches* numerous, spreading in every direction, small but very hard; *bark* dark purple. *Leaves* simple, fascicled, wedge-formed, small, smooth. *Peduncles* axillary, the length of the leaves, one or two-flowered. *Flowers* small, red. *Keel*, daggers slender, but long and sharp. *Legumes* horizontal, cylindric, smooth, pointed from six to ten-seeded.

4. I. *trita. Willd.* iii. 1228.

Annual and biennial, erect, rigid. *Leaves* ternate; *leaflets* obovate. *Racemes* axillary, sessile, many-flowered. *Legumes* reflexed, straight, rigid, four-sided, spinous, pointed, smooth.



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A native of various parts of India. In flower all the year. It grows rather tall in a good soil, but is thin of branches, and rather a hostile looking plant, when growing in a bad soil.

*Note.* This is the only species I can compare to I. *trifoliata*, and as I have reared it from seeds received from Dr. Klein of Tranquebar, under that name, am inclined to think they are the same.

5. I. *cinerea. Willd.* iii. 1225.

Shrubby, hoary. *Leaves* ternate; *leaflets* oblong, acute, hoary. *Racemes* axillary, sub-sessile. *Legumes* horizontal, four-sided, with sharp thorny points.

*Teling.* Veri neelli.

A thin, poor looking, shrubby species, grows on dry uncultivated ground often on road sides. Flowers during the wet and cold seasons.

*Stem* short, woody. *Branches* numerous, bent in every direction, very rigid, covered with hoary bark; the plant in general about two or three feet high. *Leaves* scattered, ternate, petioled. *Leaflets* oblong, or broad lanceolate, acute, entire, a very little hairy, and hoary, smaller than in any other of this family that I know, I. *aspalathifolia* excepted. *Petioles* channelled. *Stipules* subulate. *Racemes* axillary, sub-sessile, the length of the leaves. *Flowers* small, red. *Legumes* horizontal, four-sided, very sharp pointed, from six to seven-seeded; *seeds* remote.

*Note.* It seems to agree better with the description of I. *trita*, in the *Supplement* of Linnæus, than *trita* itself. Can there be any mistake? This species is immediately distinguished from that, by being much more branchy, very white or hoary, and by the form of the leaflets, which in that are obovate, and emarginate; in this broad-lanceolar, and acute.

6. I. *glandulosa. Willd.* iii. 1227.

Suffrutex, diffuse. *Leaves* ternate; *leaflets* somewhat

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wedge-shaped. *Heads* axillary. *Legumes* oval, with four elevated, prickly angles, two-seeded.

*Teling.* Baragadam.

A small shrubby species; a native of moist rich lands amongst the mountains. Flowers, and ripens its seeds during the wet and cold seasons.

*Root* woody, white. *Stem* erect, woody, branchy. *Branches* numerous, the lower ones are longer than the stem, resting on the ground, and often striking root, round, coloured. *Leaves* numerous, approximate, ternate, petioled. *Leaflets* oblong, or wedge-formed, entire, with downy points, and the under side covered with innumerable glands, probably vesicles filled with an essential oil; about an inch long, and half an inch broad. *Stipules* broad. *Racemes* axillary, sessile, oval, dense, many-flowered. *Flowers* small, red. *Bractes* solitary, one-flowered. *Keel* hairy, discoloured; *daggers* very large, long, and sharp. *Legumes* reflexed, oval, four-sided; *angles* armed with lacerated prickle-like wings, two-seeded. *Seeds* separated by a partition.

Of the seeds the natives of the hilly countries make meal, which they bake into bread, and use as an article of diet; when more agreeable food is scarce. Cattle are fond of the plant.

7. I. *prostrata. Willd.* iii. 1226.

Perennial. *Leaves* ternate; *leaflets* wedge-shaped, with glandular dots. *Racemes* axillary, sessile, the length of the petioles. *Legume* reflexed, smooth, acute, from six to eight-seeded.

This species is a small shrubby perennial; a native of the borders of cultivated lands, with a trifling, erect stem, and many longer, prostrate, round, woody, somewhat hairy branches, with ascending extremities. *Leaves* exactly as in the last, (I. *glandulosa.*) *Stipules* scarcely any. *Racemes* axillary, sessile, shorter than the leaves, many-flowered. *Flowers* small, red. *Bractes* single, subulate, one-flowered.

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*Legumes* reflexed, rigid, a little compressed, from six to eight-seeded.

8. I. *argentea. B. H.*

Shrubby. *Leaves* from single to quinate-pinnate; *leaflets* lanceolate, acute. *Racemes* longer than the leaves. *Legumes* reflexed, curved, contracted between the seeds, hoary.

A rare shrubby species; growing about the borders of cultivated lands, near hedges, trees, &c. where it meets with a rich sweet soil. Flowering time the wet season.

*Stem* scarcely any. *Branches* numerous, woody, spreading, pretty smooth. *Branchlets* alternate, nearly bifarious, hoary. *Leaves* alternate, approximate, nearly bifarious, from simple to pinnate, the lowermost on the branchlets are single, the next above paired, then ternate, &c. up to pinnate. *Leaflets* alternate, lanceolate, acute, entire, hoary, chiefly on the under side; size various, from half an inch, to an inch and a half long; all are about three-eighths broad. *Petioles* hoary, channelled, when bearing leaflets, winding. *Stipules* awled, with a callous projecting horn at the base. *Racemes* axillary, much longer than the leaves, many-flowered. *Flowers* small, red, single. *Bractes* oval, one-flowered, falling. *Legumes* reflexed, falcate, contracted between the seeds. *Seeds* from four to eight.

9. I. *uniflora* of Dr. Buchanan.

Perennial. *Branches* diffuse, long, slender, and coloured. *Leaves* sub-sessile, digitate; *leaflets* cuneate. *Flower* solitary. *Legume* three-seeded.

Mannella. *Rheed. Mal.* ix. *t.* 37.

Aspalathus *Indica. Willd.* iii. 963.

Lotus tenuifolius. *Pluck. Alm. t.* 201. *f.* 2.

A native of Mysore, from thence the seeds were sent by Dr. Buchanan to the Botanic garden, where the plants thrive luxuriantly, and continue in blossom great part of the year.

*Root* perennial. *Stem* scarcely any, but numerous, pretty

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long, very slender, red, bifariously ramous branches, spreading close on the surface of the earth, but I never found them strike root, covering, in the rich soil of Bengal, a space of three or more feet in diameter. *Leaves* generally in fives, three on the apex of a very short common petiole, the other two on opposite sides of its base, stipulaceous, all cuneate, pretty smooth, and entire; scarcely a quarter of an inch long, and about a line broad. *Stipules* only some soft hairs about the insertion of the leaves. *Peduncles* axillary, solitary, longer than the leaves, very slender, one-flowered. *Flowers* small, red. *Legumes* linear-oblong, round, sprinkled with a few short hairs, containing from two to four seeds.

10. I. *fragrans. Willd.* iii. 1231. *Retz. Obs.* iv. 29.

Suffruticose. *Leaves* from ternate, to pinnate; *leaflets* oval. *Stipules* lanceolate, hairy. *Peduncles* axillary, as long as the leaves, few-flowered. *Legumes* straight, from ten to twelve-seeded.

Colutea siliquosa. *Pluk. Alm. t.* 166. *f.* 1. good.

I. *glabra. Willd.* iii. 1231.

I have not found any other species which can be compared to the above quoted one, and suspect it to be the same. My plant is almost destitute of pubescence as it is only on the stipules, petioles, and under side of the leaves, where a little is to be found, particularly while young.

A native of Coromandel; where, like the rest of the genus it flowers in the rains and cool season.

11. I. *flaccida. Kön. Mss.*

Perennial, flaccid. *Leaves* pinnate; *leaflets* from two to three-paired, oval, smooth. *Racèmes* twice the length of the leaves. *Legumes* reflexed, curved, sub-cylindric, many-flowered.

This slender perennial species grows chiefly amongst bushes, on dry barren ground.

*Stem* woody, weak, supporting itself on bushes. *Branches*

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more so, smooth; the *young parts* of a bright green; from one to four or five feet long. *Leaves* scattered, pinnate, about two inches long. *Leaflets* from two to three pair with an odd one, equal, oval, smooth, triflingly acute; about three quarters of an inch long, and half an inch broad. *Stipules* subulate, frequently coloured. *Racemes* axillary, peduncled, twice as long as the leaves, round, smooth, many-flowered. *Flowers* pretty large, red. *Bractes* single, subulate, one-flowered. *Legumes* reflexed, slender, round, falcate, from six to twelve-seeded.

12. I. *enneaphylla. Willd.* iii. 1229.

Perennial, procumbent. *Leaves* pinnate, sub-sessile; *leaflets* minute, four-paired, obovate, smooth. *Spikelets* oval, sessile. *Legumes* oval, two-seeded.

*Teling.* Chera-gaddam.

This helps to form our very best, and most beautiful pasture lands, where it is always found in plenty. It is perennial. Flowers all the year round.

*Stem* none, but it has many, ramous, prostrate, bifarious branches spreading in every direction, close upon the ground, round, a little downy, and in general from six to twelve inches long. *Leaflets* minute, opposite, from three to five pair, obovate, smooth, entire. *Stipules* semi-lanceolate. *Spikes* axillary, oval, sessile, many-flowered. *Flowers* small, of a bright red. *Legumes* oval, smooth, two-seeded, interrupted between them. Cattle eat it greedily.

13. I. *hirsuta. Willd.* iii. 1233.

Annual, and biennial, erect, ramous, hairy. *Leaves* pinnate; *leaflets* three or four pair, obovate, hairy. *Stipules* linear. *Racemes* longer than the leaves. *Legumes* reflexed, hairy, four or five-seeded.

*Teling.* Penni vempali.

Astragalus spicatus. *Burm. Zeyl. t.* 14.

Kattu-tagera. *Rheed. Mal.* ix. *t.* 30.

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A native of Coromandel. It flowers during the rainy and cold seasons.

14. I. *viscosa. Willd.* iii. 1236.

Somewhat shrubby, hairy and glutinous. *Leaves* pinnate; *leaflets* from four to five-paired, long-obovate. *Racemes* longer than the leaves. *Legumes* straight, hairy, from six to eight-seeded.

Galega *colutea. Burm. Ind.* 172. *Willd.* iii. 1246.

Colutea siliquosa. *Pluk. t.* 166. *f.* 3.

This species grows on a very sandy soil. It flowers during the wet and cold seasons.

*Root* simple. *Stem* somewhat shrubby, erect, very ramous, from one to three feet high; the young parts covered with white, depressed hairs, and other stiffer hairs with glutinous, enlarged, glandular extremities. *Leaves* alternate, pinnate, two or two and a half inches long. *Leaflets* from four to five pairs, opposite; obovate, entire; above pretty smooth; below hairy and glandular like the tender branches. *Stipules* filiform. *Racemes* axillary, peduncled, longer than the leaves, round, like the young branches. *Bractes* awled, one-flowered. *Flowers* rather remote, small, red. *Legumes* horizontal, straight, round.

15. I. *cærulea. Roxb.*

Shrubby, hoary. *Leaves* pinnate; *leaflets* four-paired, obovate, emarginate. *Racemes* rather shorter than the leaves. *Legumes* reflexed, curved, contracted between the seeds, hoary, from three to four-seeded.

*Teling.* Karneeli.

This is an erect, shrubby species; growing on dry, barren, uncultivated ground to the height of three feet, and higher in good, garden soil. It flowers during the wet and cold seasons.

*Stem* erect, woody, as thick as a man's thumb or more, biennial or triennial, the length very various, but the whole plant, in its wild state, is generally about three feet high; where cul-



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tivated in a good soil it is often five or six feet high. *Branches* many, nearly erect, scattered, striated from the insertion of the leaves, three small ridges running down from each; entirely covered with great numbers of short, depressed, white hairs, which make the plants quite hoary; these may be easily rubbed off, leaving the branches, &c. smooth, clear and green. *Leaves* alternate, somewhat bifarious, numerous, approximated, pinnate with an odd one; about four inches long. *Leaflets* short-petioled, opposite, from three to five pairs, pale green, fleshy, the lower smallest, all obcordate, slightly emarginate with a minute bristle, above pretty smooth, but pale coloured; many short depressed white hairs cover the under side, which make it still of a fainter green than the upper side, but nothing like down on any parts of the plant, from one to two inches long, and about three quarters broad. *Petioles* covered with the same small, depressed, white hairs, channelled. *Stipules* awled, small. *Racemes* axillary, sessile, erect, shorter than the leaves, many-flowered. *Flowers* numerous, small, yellow and red. *Calyx; divisions* short, acute, equal. *Banner* and *keel* hairy; of a greenish-yellow, margins of the former involute. *Wings* of a pale rose colour, linear-oblong, processes of the keel remarkably large. *Legumes* numerous, reflexed, falcate, round, short, covered with the same hairs as the branches, and contracted a little between the seeds. *Seeds* generally three, smooth, like those of I. *tinctorea.*

This species comes near to *Indigofera argentea, Linn.* the chief differences are, that in this plant there is a total want of down; the leaves are never ternate, but always composed of from three to five pair of leaflets, with a larger single terminal one; and the legumes are very numerous on the same racemes.

From the leaves of this plant I have often extracted a most beautiful, light Indigo; more so than I ever could from the common Indigo plant, or even from *Nerium tinctorium*, and in a large proportion. After an enquiry of nearly two years, I have not been able to discover that the natives of any

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parts of India make use of it. The process by which I obtained the colour from the leaves, was exactly similar to that practised for obtaining the Indigo from the leaves of *Nerium tinctorium*, viz. by committing them while fresh, to cold water, and scalding them over a moderate fire, to about one hundred and sixty degrees of Fahrenheit's thermometer, the liquor will then have attained a beautiful deep greenish yellow colour; it is then strained off clear, and while hot, gently agitated in a broad, shallow, open vessel for a few, (twenty to thirty) minutes; during which time it changes its colour, gradually becoming darker and darker and more turbid when sufficiently agitated, if a little of it be viewed in a clean silver spoon, or any other vessel that reflects the light, a muddiness, or minute grain may be easily seen, which is rendered large, and copious by the addition of a little lime-water; this fœcula readily falls to the bottom, the superincumbent liquor is then poured off, and will be more or less of a clear brandy colour, according as the operation has been successfully conducted; for the more this liquor is tinged with green, the less perfectly has the colour been separated; and the produce, of course the more deficient and less beautiful. How to effect the most perfect separation, and precipitation of the colour, is the grand desideratum with our Indigo manufacturers, and well deserves the chemist's most serious attention.

16. I. *tinctoria. Willd.* iii. 1237.

Shrubby. *Leaves* pinnate; *leaflets* about five-paired, long-obovate, smooth. *Racemes* shorter than the leaves. *Legumes* reflexed, nearly straight, smooth, about ten-seeded.

*Pers.* Derukht-neel, the plant; and Neelep the Indigo.

*Arab.* Izlum, or Lee-lunj the plant; and Neelep the Indigo.

*Sans.* Nili.

*Beng.* Nil, or Neel.

*Teling.* Neel.



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Ameri. *Rheed. Mal.* i. *t.* 54.

Indicum. *Rumph. Amb.* v. *t.* 80.

Native place uncertain, for though now common in a wild state over most parts of India, yet is in general not remote from places where it is or has been cultivated.

17. I. *violacea. R.*

Shrubby. *Leaflets* six pair, oblong. *Racemes* axillary, half the length of the leaves. *Legumes* straight, sub-cylindric, smooth, from six to ten-seeded.

A native of the mountains about Hurdwar, where the seeds were collected by Mr. George Roxburgh, and sent to the Botanic garden, where the plants thrive well, and blossom in February and March, at which time the shrub is uncommonly ornamental, especially when the flowers begin to fade, the rosy tinge then changing to a lively violet.

18. I. *elliptica. Roxb.*

Shrubby. *Leaflets* six pair, exactly elliptic; smooth. *Racemes* axillary, and from the naked branches, the length of the leaves. *Legumes* divaricate, straight, smooth, eight-seeded.

A stout, shrubby, ramous, tolerably erect species; a native of the eastern parts of Bengal; Flowering time the cool and beginning of the hot season, when the plant is nearly destitute of leaves.

*Leaves* pinnate, from three to six inches long. *Leaflets* from four to eight pair, very exactly elliptic, being equally rounded at each end, and all nearly equal; smooth on both sides; about an inch long, by half of an inch broad, and generally deciduous during the cool season. *Stipules* minute, hairy. *Racemes* axillary, but more generally from the leafless branchlets of the former year, scarcely so long as the leaves, a little hairy. *Bractes* oval, concave, ciliate, one-flowered, caducous. *Flowers* pretty large, of a bright, lively pink. *Legumes* straight, somewhat four-sided, divaricate, smooth, acute, from six to ten seeded.

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19. I. *arborea. Roxb.*

Arboreous. *Leaves* pinnate; *leaflets* from six to nine pair, oval, emarginate. *Racemes* the length of the leaves. *Wings* expanded. *Legume* fluted, straight, smooth.

This stately species was reared in the Botanic garden from seed sent from the Shreenagur mountains by Captain Hardwicke in 1796. Time of flowering, at Calcutta, the month of March.

*Trunk* erect, in twelve years as thick as a man's leg. *Bark* dark brown. *Branches* numerous, spreading in every direction; *young shoots* somewhat scabrous, height of the whole plant, when twelve years old, about twelve feet. *Leaves* alternate, pinnate, about four inches long. *Leaflets* from six to nine pair, oval, emarginate, somewhat scabrous with very short hairs. *Stipules* subulate. *Racemes* axillary, solitary, nearly the length of the leaves. *Flowers* solitary, short-pedicelled, large, and of a very beautiful, bright, reddish-violet colour. *Legumes* linear, smooth, reflexed, sharp pointed, containing from six to twelve seeds.

20. I. *atropurpurea. Buch.*

Shrubby, erect. *Leaves* pinnate; *leaflets* from six to eight pairs, oval, smooth. *Racemes* when in flower, as long as the leaves in seed twice their length. *Legumes* cylindric, straight, reflexed, from eight to nine-seeded.

A native of Nepal, from thence introduced by Dr. Buchanan, into the garden in 1802, and in about eight months the plants they produced were from three to five feet high, with a simple, shrubby, straight stem and few branches, with young tender parts somewhat villous.

*Leaves* pinnate, from six to twelve inches long. *Leaflets* opposite, from six to eight pair, short-petioled, oval, entire, smooth on both sides, an inch and a half long, by one inch broad. *Stipules* subulate; those of the petioles caducous; those of the leaflets, for each pair has a pair or more, permanent. *Racemes* axillary, by the time all the flowers have

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fallen, considerably longer than the leaves, even twice their length. *Flowers* numerous, scattered, before expansion imbricated, large, of a dark purple. *Bractes* one-flowered. *Legumes* cylindric, smooth, reflexed, from six to twelve-seeded.

The same plant has been reared from American seeds sent without a name from Philadelphia by William Hamilton, Esq.

21. I. *pulchella. Roxb.*

Shrubby, erect. *Leaves* pinnate; *leaflets* from eight to ten-paired, obovate. *Racemes* longer than the leaves. *Legumes* reflexed, straight, smooth, from ten to twelve-seeded.

An erect, ramous shrub.

*Stem* and *branches* round, smooth; *bark* dark rust coloured. *Leaves* scattered, pinnate, with an odd one, from four to six inches long. *Leaflets* from eight to ten-paired, obovate, somewhat emarginate with a little bristle, a little hairy, three-fourths of an inch long, by one half broad. *Stipules* awled, falling off long before the leaves are fully expanded. *Racemes* axillary, longer than the leaves, short-peduncled. *Flowers* numerous, large, rose-coloured. *Bractes* lanceolate, concave, one-flowered, falling. *Legumes* cylindric, smooth, reflexed, an inch or an inch and a quarter long, from ten to twelve-seeded.

22. I. *uncinata. R.*

Shrubby, with far extended branches. *Leaflets* from eight to ten pair, elliptic. *Spikes* sessile, much shorter than the leaves, dense. *Daggers* of the *keel* hooked, and obtuse. *Legumes* erect, subulate, many-seeded.

A native of Pegu, from thence introduced into the Botanic garden, where it becomes a very stout shrub, with far extended branches; the young shoots and leaves slightly clothed with minute white hairs. *Stipules* small, subulate. *Flowers* very much crowded, reflexed, banner and keel of a pale greenish yellow, wings small and red. *Legumes* long, cylin-

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dric, perfectly erect, five-pointed. It flowers in the rains, and the seed ripens in the cool season.

23. I. *purpurescens. R.*

Sub-arboreous. *Bark* a little scabrous. *Leaves* pinnate. *Leaflets* ten pair, from oval to broad-elliptic, sub-emarginate, a little hairy. *Racemes* axillary and from the leafless branches, length of the leaves.

A native of the interior of the peninsula of India. In the Botanic garden it has in two years grown to be a stout small tree, with a distinct trunk, and numerous spreading branches. It flowers in February and March, at which time few plants surpass it in beauty, the flowers being large, very numerous, and of a bright rose-colour changing to lively purple. Seed ripens in May.

24. I. *virgata. R.*

Shrubby. *Leaves* pinnate; *leaflets* as far as twelve pair, sub-alternate, or opposite, linear-oblong. *Racemes* the length of the leaves.

A native of Nepal. In the Botanic garden at Calcutta it flowers during the hot season, March, April and May.

*GALEGA. Schreb. gen. N.* 1206.

*Calyx* with subulate teeth, nearly equal. *Legume* with oblique streaks between the seeds.

1. G. *spinosa. Willd.* iii. 1250.

Suffruticose, hoary. *Leaflets* minute, about nine, wedge-shaped. *Stipules* spinescent. *Flowers* axillary. *Legumes* scimitar-shaped, horizontal, smooth, about six-seeded.

*Teling.* Mullo-yampalli.

A small ramous species, a native of dry barren lands on the coast of Coromandel.

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2. G. *pentaphylla. Roxb.*

Shrubby, ramous, erect, hoary. *Leaflets* five, cuneate, emarginate, sericeous underneath. *Stipules* subulate. *Flowers* axillary, one or two. *Legumes* linear, incurved, villous.

Seeds sent by Mr. B. Heyne from Mysore in 1801, to the Botanic garden, produced many very ramous thriving shrubs by plants, which blossomed when about one year old, and were then from one to three feet in height.

*Trunk* scarcely any, but numerous, cinereous, ligneous branches spreading in every direction. *Leaves* alternate, pinnate. *Leaflets* two pair, with a terminal single one, which is by far the largest, all are cuneate, emarginate, above pretty smooth, underneath clothed with appressed, soft white hairs, from one to two inches long. *Petioles* short, hairy, channelled. *Stipules* subulate. *Flowers* axillary, one or two together, short-peduncled, middle-sized, of a dull pale red colour. *Legumes* spreading, linear, incurved, villous, from six to eight-seeded.

3. G. *Heyneana. Roxb.*

Shrubby, ramous. *Leaves* bifarious; *leaflets* from five to seven, oval, and oblong, tomentose underneath. *Racemes* axillary, the length of the leaves. *Stipules* conical. *Legumes* straight, pendulous, villous.

Reared in the Botanic garden from seed sent by Mr. B. Heyne, from Mysore, where the plant is indigenous. Flowering time in Bengal, the cold season.

*Stem* straight; *branches* ascending, flexuose, tomentose; the height of the plants in the Botanic garden when about eighteen months old, three feet. *Leaves* alternate, bifarious, pinnate. *Leaflets* from three to seven, the lower pair much smaller, inserted on the very base of the petioles, close to the stipules; the rest gradually larger, and more lengthened in proportion to their breadth; all are clothed with much soft, close, light coloured down on the under side, and almost smooth above. *Petioles* downy, channelled. *Stipules* trian-

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gular, tapering to an acute point. *Peduncles* axillary, solitary, downy, about as long as the leaves, bearing a few, dull reddish, pretty large flowers, at and about the apex only. *Bractes* the exterior two three-fold, three-flowered; the inner series uncertain. *Calyx* downy. *Banner* of a dark brownish red, villous on the back. *Legumes* drooping, straight, slightly villous, from eight to twelve-seeded.

4. G. *incana. Roxb.*

Shrubby, diffuse, flexuose, hoary with white down. *Leaflets* six pairs, obovate, emarginate, hoary. *Stipules* taper-triangular. *Racemes* terminal. *Legumes* reflexed, falcate, very hairy.

A native of Mysore.

*Stem* scarcely any, but numerous, flexuose *branches*, and *branchlets*, spreading to a considerable extent; *young parts* clothed with erect, soft, white down. *Leaves* alternate, pinnate, from three to four inches long. *Leaflets* from five to eight pair, obovate, deeply emarginate, hoary, particularly the margins, and the lower side. *Stipules* reflexed by age, triangular, acute. *Racemes* terminal, long, and downy. *Bractes* three-fold, three-flowered. *Flowers* short-pedicelled, the middle one of the three expanding long after the other two. *Calyx* clothed with much fulvous pubescence. *Legumes* bending back close to the rachis of the racemes, much curved, very hairy, from six to eight-seeded.

5. G. *villosa. Willd.* iii. 1245.

Shrubby, diffuse, flexuose, somewhat hoary. *Leaflets* from six to eight pair, cuneate, sub-retuse. *Stipules* ensiform, recurved. *Racemes* terminal. *Bractes* three-fold, two-flowered. *Legumes* reflexed, sickle-shaped, hairy, from five to six-seeded.

Coronilla zeylanica. *Burm. Zeyl.* 78. *t.* 33.

A native of various parts of India, in blossom and seed



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greater part of the year. These plants delight most in the sandy lands at no great distance from the sea.

6. G. *purpurea. Willd.* iii. 1247.

Shrubby, sub-erect, smooth. *Leaflets* about seven pair, cuneate, smooth. *Stipules* filiform. *Racemes* terminal. *Bractes* three-fold, subulate, three-flowered. *Legumes* ascending, sickle-shaped; smooth, from six to seven-seeded.

Coronilla zeylanica herbacea. *Burm. Zeyl.* 77. *t.* 32.

A native of the sandy lands of the coast of Coromandel, and in blossom most part of the year.

7. G. *lanceæfolia. Roxb.*

Shrubby, dichotomous. *Leaflets* from thirteen to nineteen, lanceolar. *Stipules* subulate. *Racemes* terminal, and lateral; *rachis* angular. *Bractes* ensiform, many-flowered. *Legumes* falcate, smooth, from three to five-seeded.

A native of the sandy lands near the shores of Coromandel. Flowering time the close of the rains, and cool season.

Shrubby, with numerous, dichotomous, round, pretty smooth, coloured, ascending branches; the general height of full grown plants in the Botanic garden is about two feet. *Leaves* pinnate; *leaflets* from five to eight or nine pairs, and a terminal one, opposite, short-petiolate, lanceolar, smooth above, a little villous and paler underneath; the largest about an inch long, and less than half an inch broad. *Petioles* channelled, a little villous. *Stipules* subulate, permanent. *Racemes* lateral, axillary, or terminal, about as long as the leaves. *Bractes* three-fold, ensiform, from three to six-flowered. *Flowers* of a deep bright purple, short-pedicelled. *Legumes* diverging, becoming rectilinear, smooth, incurve-falcate, three, four, or five-seeded; and contracted on the side between them.

8. G. *tinctoria. Willd.* iii. 1248.

Shrubby, ramous, villous. *Leaflets* from thirteen to

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nineteen, obovate-cuneate, emarginate, villous underneath. *Stipules* subulate. *Racemes* longer than the leaves. *Bractes* tern, more than two-flowered, in succession. *Legumes* spreading, slightly falcate, somewhat villous, from four to five-seeded.

A native of various parts of India, delighting in a warm sandy soil. Flowering time the rains, and cool season.

9. G. *diffusa. R.*

Shrubby, diffuse, scarcely villous. *Leaflets* from eleven to twenty-one, sub-cuneate, emarginate. *Stipules* subulate. *Racemes* terminal. *Legumes* diverging from the rachis, straight, nearly smooth, from six to seven-seeded.

A native of the Circars, in flower and ripe seed most part of the year, but more frequently from the close of the rains to the end of the cool season.

*ASTRAGALUS. Schreb. gen. N.* 1208.

*Legume* two-celled, gibbous.

A. *hamosus. Willd.* iii. 1279.

Caulescent, procumbent. *Legumes* subulate, recurved, smooth. *Leaflets* obcordate, villous underneath.

A native of Persia flowering in the cold season in the Botanic garden.

*PSORALEA. Schreb. gen. N.* 1210.

*Calyx* sprinkled with callous points, the length of the one-seeded legume.

1. P. *corylifolia. Willd.* iii. 1351. *Burm. Ind.* 172. *t.* 49. *f.* 2.

Annual, erect, from three to four feet high. *Leaves* simple, rarely ternate; ovate-cordate, scallop-toothed. *Stipules*



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recurvate. *Racemes* long-peduncled. *Bractes* three-flowered.

*Teling.* Kor-Gestum.

*Beng.* Hakooch.

A native of various parts of India, and commonly found in the vicinity of villages during the rainy and cold seasons.

2. P. *obovata. Roxb.*

Shrubby. *Leaves* ternate; *leaflets* obovate, villous underneath. *Flowers* lateral, long-pedicelled, several on a short common peduncle. *Legumes* tapering to a very long mucronate point, downy.

A native of the country about Hurdwar, where Captain Hardwicke found it in flower and seed in April.

*TRIFOLIUM. Schreb. gen. N.* 1211.

*Flowers* sub-capitate. *Legume* scarcely longer than the calyx, gaping, deciduous.

1. T. *Indicum. Willd.* iii. 1353.

Annual, erect. *Leaflets* cuneate, serrulate. *Stipules* subulate. *Racemes* elongated. *Legumes* rugose, oval, or two-seeded.

*Beng.* Bun methee.

Suendadi-pullu. *Rheed. Mal.* ix. *t.* 40.

Melilotus humilis erecta, &c. *Pluck. Alm. t.* 45. *f.* 5.

A native of various parts of India, appearing during the dry season from October till March, when the seeds are ripe, and then it perishes.

2. T. *officinale. Willd.* iii. 1355.

Annual, erect. *Leaflets* obovate, serrate. *Stipules* subulate. *Racemes* elongated. *Legumes* naked, globular, one-seeded.

Melilotus lutea, &c. *Pluk. Alm. t.* 45. *f.* 4.

*Beng.* Bun-piring.

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A native of Bengal, and, with the last, appears during the dry season only.

*TRIGONELLA. Schreb. gen. N.* 1218.

*Banner* and *wings* sub-equal, expanding in form of a three-petalled corol.

1. T. *Indica. Willd.* iii. 1403.

Herbaceous, procumbent. *Leaflets* lanceolar, entire. *Peduncles* axillary, from two to four-flowered. *Legumes* straight, cuspidate.

Lotus madraspatensis, &c. *Pluk. Alm. t.* 200. *f.* 7. good.

A native of Coromandel. In flower all the year.

2. T. *Foenum græcum. Willd.* iii. 1402.

Annual, erect. *Legumes* sessile, long, straight, with filiform point.

*Arab.* Hulbeh.

*Beng.* Methee.

*Teling.* Mentee.

Is much cultivated in many parts of India, particularly in the higher, inland provinces.

3. T. *corniculata. Willd.* iii. 1400.

Annual, diffuse. *Leaflets* obovate, serrate. *Stipules* lanceolate-dentate. *Peduncles* longer than the leaves. *Heads* many-flowered. *Legumes* sickle-shaped, smooth, many-seeded.

*Sans.* Lunkaika.

*Beng.* Piring. The plant is cultivated as a pot-herb during the cold season.

*MEDICAGO. Schreb. gen. N.* 1214.

*Legume* compressed, bent in. *Keel* bent down from the banner.

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M. *polymorpha.*

*Legumes* spiral. *Stipules* toothed. *Stem* diffused.

Two varieties of this are found wild, on loose sandy soil, on the banks of the Ganges, towards Hurdwar; one is M. *hispida* of Gærtner, the other I am less certain of.

# CLASS XVIII.

## POLYADELPHIA ICOSANDRIA.

*CITRUS. Schreb. gen. N.* 1218.

*Calyx* five-cleft. *Petals* five. *Stamina* twenty or more, united into several distinct bodies. *Berry* many-celled.

1. C. *acida. R.*

Sub-arboreous, armed. *Petioles* more or less winged; *leaves* from oval to oblong, and ovate-oblong, crenate, obtuse. *Corol* generally four-petalled.

Malus limonia acida. *Bauh. Pin.* 436.

*Sans.* Jumbira, or Jumbeera. This name applies equally to all the varieties.

*Beng.* Leboo, Neboo.

Under the above definition I mean to comprehend the various varieties, if not species, of the sour lemons or limes found in India, and as the petioles are very generally winged I think it necessary to separate them from the lemons and citrons which have not that mark, or have it in a very trifling degree.

In Bengal the following sorts have come under my inspection, the whole being cultivated under my own eye, in the

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Botanic garden, and are arranged according to the estimation in which they are held by both natives and Europeans.

1*st.* Pati-Leboo, or Neboo. *Fruit* oval, about two inches long by one and a half or one and three quarters in diameter; *apex* rather pointed; *skin* thin and smooth, when ripe yellow, from eight to ten-celled, abounding in pale coloured very acid juice.

2*nd.* Kaguji-Neboo. Like the last a small, very ramous, well armed tree. *Petioles* winged. *Fruit* oblong, smooth, thin-skinned, when ripe yellow, vertical diameter from two to two and a half inches, and from four to six in circumference; it ripens in July and yields a large proportion of sharp acid, pale juice.

3*rd.* Gora-Neboo. The tree is one of the smallest, but very ramous, and equally armed. *Petioles* less winged than in the other varieties. *Fruit* oval, with a protuberant base. *Skin* rather thick, rougher than in the first two varieties; the vertical diameter about three inches, and the circumference from six to eight; it ripens in September, and is then yellow, with juice as in the former varieties.

4*th.* China-gora-Neboo. This variety was twenty years ago introduced from China. The tree is rather small but equally ramous and armed with the others. *Fruit* round, the vertical and transverse diameter being the same, and generally about two inches; it ripens in August, and contains abundance of rich looking, pale yellow, acid juice.

5*th.* Camaral-Neboo. A rather large, but thinly branched tree. *Fruit* long-oval; *skin* thin, and smooth; the vertical diameter four or five inches, and from eight to twelve in circumference; it ripens in November, is then remarkably full of pale juice.

A small one which weighed eighteen ounces, yielded just half that weight of juice.

6*th.* Rungpore Lime; the vernacular name not ascertained. A very small tree, or shrub, with but few small thorns. *Fruit* perfectly spherical, the size of a small orange, being six or

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seven inches in circumference; small, with a thin skin, of a light lively yellow colour; juice pale, and acid.

*7th.* Taba-Neboo. A small, ramous, very thorny tree, with the petioles winged. *Fruit* nearly round; *skin* thick, spongy like the citron, pretty smooth, from twelve to eighteen inches in circumference; it ripens in November, and contains several ounces of very acid juice.

*8th.* Arabian Lime from Muscat. The trees are young, and have not attained their full growth. *Fruit* nearly spherical, about the size of a small shaddock; *skin* thick, and spongy, like the citron, and externally very uneven.

*9th.* Meetha Lemoo, *i. e.* sweet lime. A small, very ramous, well armed tree. *Fruit* round, very smooth and thin-skinned, in general about the size of a small orange; juice insipidly sweet.

2. C. *medica. Willd.* iii. 1426.

*Petioles* linear; *leaves* ovate, acuminate.

*Beng.* Lemoo or Nemoo.

Lemon tree.

On the continent of India, it is found in gardens, where it blossoms most plentifully during the hot season, and the fruit ripens about the close of the rains.

The citron (*Sans.* Beeja-poora, *Arab.* Utrej, *Pers.* Turcre, *Hind.* Bejoura) is likewise found common in gardens, where it blossoms, and bears fruit abundantly the whole year. There are now, besides the large rough-skinned common citrons, three varieties or species in the Botanic garden reared above twelve months ago, from seed from the Garrow hills where they are found indigenous in the forests.

3. C. *Aurantium. Willd.* iii. 1427.

*Petioles* winged. *Leaves* acuminate.

*Sans.* Nagarunga.

*Arab.* Narunj.

*Beng.* Kumla-neboo.

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*Hind.* Narenj, Narangee; of the orange like the lime, we have many varieties to the eastward of the Cape of Good Hope, (See *Rumph. Herb. Amb. vol.* ii.) but as they do not thrive in any part where I have yet been stationed, I cannot well enter into any satisfactory account of them.

4. C. *decumana. Willd.* iii. 1428.

*Petioles* winged. *Leaves* obtuse, emarginate.

*Beng.* and *Hind.* Batavi-Neboo.

Limo Decumanus. *Rumph. Amb.* ii. 96. *t.* 24. *f.* 2.

Of this elegant useful tree, the shaddock, we have two varieties, one with white, and the other with red pulp, differing in size and quality, according to the soil, climate, and situation. On the continent of India so far as I know, we have the tree in our gardens only; the Bengalee name, viz. *Batavia lime,* denotes its being an exotic here.

5. C. *inermis. Roxb.*

Shrubby, unarmed. *Petioles* naked; *leaves* lanceolar, scarcely crenulate, obtuse.

*Chin.* Kum-quat.

Limonellus Madurensis. *Rumph. Amb.* ii. 110. *t.* 31.

A small, shrubby species; from China it has been introduced into the Botanic garden, where it blossoms in April.

*Stem* scarcely any, but numerous, unarmed, very ramous, smooth branches spreading and rising in every direction. *Leaves* alternate, petioled, lanceolar, some of them slightly crenulate, obtuse, smooth on both sides, from two to three inches long, and about one broad. *Petioles* about a quarter of an inch long, toward the apex margined. *Peduncles* axillary, generally solitary, the length of the petioles, one-flowered. *Calyx* small, flat, five-toothed. *Petals* five, lanceolate, recurved. *Filaments* variously united. *Anthers* from ten to fifteen. *Germ* superior, with the base surrounded with a fleshy ring, from four to five-celled, with from one to three



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ovula in each, attached to the axis. *Style* the length of the stamina. *Stigma* large, and clammy.

## POLYADELPHIA POLYANDRIA.

*MELALEUCA. Linn. Gært. Smith, &c.*

*Calyx* five-parted, semi-superior. *Corol* five-petalled. *Stamina* about forty-five, very long, conjoined in five bodies. *Style* single. *Capsules* three-celled. *Seeds* numerous.

1. M. *Cajuputi. Pharm. Lond.* 1809.*

*Branchlets* pendulous. *Leaves* alternate, sub-vertical, narrow-lanceolar, three, rarely five-nerved. *Spikes* terminal and axillary, comose, villous. *Bractes* lanceolate, three-flowered.

Arbor alba minor, Cajuputi, Daun kitsjil, and Caju-Kilan, *Rumph. Amb.* ii. *p.* 76. *t.* 17 *f.* 1.

This elegant, useful, small tree, is a native of the Molucca Islands; and as it is from its leaves that the valuable medicine called *Cajuputi oil* is obtained, it became an object of importance to try if it would grow in Bengal, where the medicine is frequently used with the best success. During my absence at the Cape of Good Hope, on account of bad health in 1798, Dr. John Fleming had charge of the Botanic garden; at the same time Mr. Smith, the nurseryman, was employed on the Molucca Islands, collecting plants for the garden, consequently it was an excellent time for obtaining grow-

* With the compilers of the *Pharmacopœia* of the Royal College of Physicians of London for 1809, I agree in supposing the essential oil called *Cajuputi* is prepared from the leaves of the small *Melaleuca* called by Rhumphius *Arbor alba minor;* and also that this tree is specifically different from his *Arbor alba major, Herb. Amb.* ii. *p.* 72. *t.* 16. *(Melaleuca Leucadendron,)* but I think the trivial name *Cajuputi,* which they have given to this species, may lead to a wrong conclusion, because that Malay appellation is more directly that of *Arbor alba major.*

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ing plants of the tree; Dr. Fleming therefore gave Mr. Smith strict orders to be very careful to get the proper sort, two or three being mentioned by Rumphius, from which the best oil was obtained. This commission Mr. S. executed to our satisfaction, many thriving plants having been sent to the garden by the close of the year, where they continue to grow freely, and in six and seven years they began to blossom at various times of the year, which they have hitherto continued to do, and to ripen their seeds perfectly. From them numerous plants have been reared, and not only distributed over many parts of the continent of India, but sent to various other quarters of the world. It is from the original young trees, now (1811,) thirteen years old, that the following description, and the accompanying figures are taken.

*Trunk* tolerably erect, but crooked; and slender for the age of the trees. *Bark* of a very light or whitish ash-colour, soft, thick, and spongy, pretty smooth on the surface, the exterior lamina peels off from time to time in thin flakes, like that of the birch tree; and the interior part may be separated into numerous lamina, like the leaves of a book. *Branches* scattered, with the slender twigs often drooping as completely as in the weeping willow, they are round and smooth; *young shoots* sericeous; height of the young trees (thirteen years,) above mentioned about twelve feet, and the thickest part of the trunk not more than a man's leg, including the bark, which is three quarters of an inch thick. *Leaves* alternate, projecting in every direction, but most frequently vertical, short-petioled, narrow-lanceolar, while young sericeous, sometimes slightly falcate, entire; from three to five inches long, and from half to three quarters of an inch broad; on being bruised they smell strong of the balsam they yield, yet the cells which contain this aromatic fluid, are scarcely visible in the fresh leaves. *Spikes* terminal, and from the extreme axills, downy, while in flower there is only a scaly conic bud at the apex, which soon advances into a leafy branchlet. *Bractes* solitary, lanceolate, sericeous, three-flowered, caducous.



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*Flowers* tern, sessile, small, white, inodorous. *Calyx* urceolate, semi-supera, sericeous; *margins* of five semilunar deciduous segments. *Petioles* five, orbicular, short-clawed, white, much longer than the segments of the calyx. *Filaments* from thirty to forty, united into five portions at the base, three or four times longer than the petals, and with them inserted into the large, villous, five-lobed rim of the calyx, alternate with its segments. *Anthers* ovate-cordate, with a yellow gland on the apex. *Germ* ovate, with the lower half united to the calyx, three-celled, with numerous ovula in each attached to an elevated receptacle in the inner and lower angle of each cell. *Style* rather longer than the stamina. *Stigma* obscurely three-lobed. *Capsules* completely enveloped in the thick, fleshy, gibbous, permanent calyx, three-lobed, three-celled, three-valved; *valves* thin, hard, and elastic, opening from the apex. *Partitions* contrary. *Receptacles* triangular, thin, flat, lodged in the inner and lower angle of the cell. *Seeds* numerous, angularly wedge-shaped.

It is readily cultivated both by the root and seed; when by the root, slender pieces thereof cut into little bits, and laid horizontally in the earth, during the rainy season, soon produce plants.

From the leaves is distilled the beautiful, green, aromatic, camphorate, essential oil called by the Malays at Amboyna, where it is chiefly made, *Cajuputi*, from *Cajuputi* one of the Malay names of the tree.

When this tree was received into the Botanic garden, and for the first five or six years afterwards, I was inclined to think it *Arbor alba major. Rumph Amb.* ii. *t.* 16. on account of its very rapid growth during that period; as well as because it was then very generally understood, that the essential oil *Cajuputi* was obtained from that tree. But for these last six or seven years, the growth (of several trees) has been so slow, though in perfect health, flowering and ripening abundance of fertile seed, at all seasons of the year, as to induce me to waver in my former opinion, and become rather inclined to

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consider it *Arbor alba minor* of the same author. This idea was encouraged by finding our trees agree, in most respects, better with Rumph's description of the latter, than with the former, and particularly because he expressly says that an essential oil is obtained by distillation from the leaves of the small sort; but makes no mention of any such oil being procured from the large species. These conjectures have received additional support, I may say confirmation, from the *Pharmacopœia* above quoted. The following is a copy of Dr. Powell, the translator's note, on this subject.

"This oil was supposed to be the produce of the *Melaleuca Leucadendron*, but it appears from the specimens of the tree yielding the true *Cajuputi*, sent home by Mr. Christopher Smith, that the species is different, and referable to *tab.* 17 of Rumphius's *Herbarium Amboinense, (vol.* xi.*)* and not to that author's *Arbor alba, tab.* 16. After a careful examination of specimens in Sir Joseph Banks', and other collections, by Dr. Maton, and of those in the *Linnæan Herbarium* by Dr. Smith, we are authorized to consider the tree which yields the above oil, as a new species, and from the names of its medicinal product, those gentlemen have agreed to give it the appellation of *Melaleuca Cajuputi.*"

As there are two figures in the 17th table of Rumphius, Dr. Powell should have specified which of the two is meant, but I take it for granted that it is the 1st.

2. M. *Leucadendron. Willd.* iii. 1428. *Smith in Trans. of Linn. Soc.* iii. 274.

*Leaves* alternate, vertical, lanceolate-falcate, five-nerved, tender parts smooth.

Arbor alba. *Rumph. Amb.* ii. *t.* 16.

This species was only introduced into the Botanic garden in 1811, whereas M. *Cajuputi* has been there since 1797-8. The plants of the former are still small, nor can they be expected to blossom for some few years to come, their growth is scarcely so rapid as that of *Cajuputi;* in habit, plants of the

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same age are very much alike, but the leaves of this species are larger, more falcate, and possess little or no fragrance when bruised, nor can I discover that they are ever employed in the distillation of the *Cajuputi* oil; to those obvious marks of distinction in the young tree I may add that all the most tender shoots, leaves, &c. are here perfectly smooth; while in *Cajuputi* they are sericeous.

3. M. *viridiflora. Gært. Sem.* i. 173. *Smith. in Trans. of Linn. Soc.* iii. *p.* 275. *Willd.* iii. 1429.

*Branchlets* erect. *Leaves* alternate, lanceolar, five-nerved. *Spikes* terminal, downy. *Flowers* tern.

4. M. *Leucadendron. B. Linn. Suppl.* 342.

A large tree, a native of Pulo Pinang, and the peninsula of Molucca. The leaves of the trees which grow in those places are when preserved in the specimens sent to me, void of fragrance.

*Leaves* alternate, short-petioled, lanceolar, entire, five-nerved, with many delicate, anostomosing veins between them, of a firm rigid texture, and smooth on both sides, from two to four inches long, and less than one broad. *Stipules* none. *Spikes* terminal and axillary, often compound, tufted, before the flowers expand imbricated with bractes, a little downy. *Bractes* oblong, sessile, three-flowered; the extreme ones barren, and from their centre the branchlets continue to shoot. *Flowers* numerous, small. *Calyx* above, five-parted; *divisions* of the border rounded, and deciduous. *Petals* sessile, round, concave scarcely larger than the division of the calyx. *Filaments* from thirty to fifty, united near the base into five erect bodies. *Anthers* small, incumbent, oval, two-lobed. *Germ* round, hid in the calyx. *Style* as long as the stamens. *Stigma* simple. *Capsules* hid in the globular calyx, which it adheres to, three-celled, three-valved, somewhat downy. *Seeds* numerous, minute, clavate, angular, somewhat winged.

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5. M. *rigida. Roxb.*

*Leaves* alternate, approximate, sessile, linear-lanceolate, rigid, pungent-mucronate, nerveless, but slightly striated, spikes panicled. *Flowers* tern.

A native of the Molucca Islands. To what size it grows I cannot say.

*Leaves* approximate, scattered, sessile, straight, linear-lanceolate, rigid, very smooth nevertheless, but slightly striated lengthways, sharp pungent-pointed, about three fourths of an inch long, by one line in breadth. *Spikes* termimal, cylindric, five or six of them forming the panicle, ending in a small bud, which in due time protrudes a branchlet beyond them, and by the time the seeds are ripe, the capsules are lateral. They are tasteless. *Calyx* smooth, border of five large, rounded segments. *Petals* five, sub-sessile, round. *Filaments* about twenty-five, much longer than the corol, united at the base into five bodies. *Germ* smooth. *Style* rather shorter than the stamens. *Stigma* simple.

*DURIO. Schreb. gen. N.* 1221.

*Calyx* gibbous, five-toothed. *Corol* five or six-petalled. *Stamina* in five bodies. *Style* single. *Pome* superior, five-celled.

D. *Zibethinus. Willd.* iii. 1434. *König in Trans. of Linn. Soc.* vii. *p.* 266.

Durio. *Rumph. Amb.* i. *t.* 29.

A native of the Malay Islands. The fleshy aril which envelopes the seed of this large fruit, like that of the Jack, is the part eaten; but not so universally admired, for its strong, by some thought very offensive, smell.

*HYPERICUM. Schreb. gen. N.* 1224.

*Calyx* five-leaved. *Petals* five. *Filaments* many, conjoined into five sets.

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1. H. *cernuum. Roxb.*

Shrubby, branchlets drooping. *Leaves* sessile, broad-lanceolate. *Flowers* terminal, sub-solitary. *Styles* five.

*Asiat. Res.* vi. *p.* 369.

A native of the mountains between Hurdwar and Shreenagur, from thence the seeds were sent by Captain Hardwicke, to the Botanic garden in 1797, where it blossoms during the cold season. It resembles, in many respects, the species described under the name H. *monogynum.*

*Stems*, or rather *branches* numerous from the same root, rising in every direction, soon dividing into numerous long, slender, round, smooth, coloured, drooping twigs. *Bark* brown, and smooth, height of the whole plant about three feet, and still more in diameter. *Leaves* opposite, sessile, decussate, broad-lanceolate, obtuse, somewhat nervous, entire, margins not revolute, smooth, of a lively green on both sides, from one to two inches long. *Flowers* terminal, at the ends of the long, pendulous branchlets, generally solitary, though sometimes two or even three-fold, large, of a pure yellow. *Peduncles* short, with two small, brown, caducous bractes near the middle. *Calyx* five-leaved; *leaflets* lanceolate, acute. *Petals* obliquely-oblong, four times longer than the calyx. *Filaments* numerous, from one to two hundred, coalesced into five bodies, just at the base only, and about half the length of the petals. *Germ* ovate. *Styles* five, the length of the stamens.

This is so nearly allied to the plant I have taken for H. *monogynum*, No. 977, that I could scarcely deem them distinct species, were it not for the difference in the number of stamina and styles. In *monogynum* there are about fifty of the former only, and uniformly a single style with a five-cleft apex.

2. H. *monogynum. Willd.* iii. 1442.

Shrubby. *Leaves* sessile, linear-oblong. *Corymbs* terminal. *Stamina* the length of the petals. *Style* single. *Stigma* five-cleft.

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H. *aureum. Lourier. Cochin Ch.* 578.

*Chin.* Keemsee-jau-taing.

H. *monogynum. Miller's Figures, t.* 151. *f.* 2. *Curt. Bot. Mag. N.* 334.

A low, but ramous shrub, growing in the Company's Botanic garden, originally from China. In flower and seed great part of the year.

*Stem* none, but branches innumerable. *Bark* pretty smooth, brown. *Leaves* approximate, opposite, decussate, sessile, and nearly stem-clasping, horizontal, linear-oblong, obtuse, entire, smooth on both sides; from one to two inches long. *Stipules* none. *Flowers* terminal, from one to so many as form a small umbel, short-peduncled, large, of a bright yellow. *Calyx* five-leaved; *leaflets* smooth, oblong, green. *Petals* five, obliquely wedge-formed as in the monodelphous flowers. *Filaments* from thirty to fifty, in five phalanges, nearly as long as the petals. *Anthers* oval, incumbent. *Style* single, as if composed of five, being five-grooved, as long as the stamens. *Stigma* five-cleft. *Capsules* five-partible, five-celled, opening from the apex. *Seeds* many.

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# CLASS XIX.

## SYNGENESIA AEQUALIS.

*SONCHUS. Schreb. gen. N.* 1233.

*Receptacle* naked. *Calyx* imbricated, gibbous. *Pappus* hairy, sessile.

1. S. *orixensis. Roxb.*

Annual. *Flowers* sub-umbelled; *peduncles* hairy, calyces woolly. *Leaves* lanceolate, and sagittate, stem-clasping, lobes rounded, margins scolloped, finely-toothed, smooth.

*Beng.* Bun-palung.

*Teling.* Nalla-tapata.

A rare plant, a native of rubbish, &c. near Samulkota. It flowers during the latter part of the cold season.

*Stem* annual, erect, from three to six feet high, as thick as the fore finger, somewhat branchy, piped, round, smooth, except near the top, where there are a few hairs with glandular extremities. *Leaves* approximate, stem-clasping; the lower ones linear, or lanceolate, scolloped, the upper ones sagittate, all are finally prickle-toothletted, both sides smooth; *size* very various. *Flowers* numerous, large, yellow, terminal, umbelliforum, calyces involved in a little soft woolly substance. Cattle are fond of every part of the plant, on being wounded there is much milky juice discharged, which thickens into a substance like fresh soft *opium.*

2. S. *oleraceus. Willd.* iii. 1514.

Annual. *Flowers* sub-umbelled; *peduncles* and *calyces*

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smooth. *Leaves* pinnatifid, and sagittate, stem-clasping, finely-toothed.

Compare with *Prenanthes sonchifolia. Willd.* iii. 1541.

*Teling.* Eatrinta.

This species is much more common than the last described, it delights in the same soil. It flowers during the same season, is also annual, branchy, and about the same size.

*Leaves* approximate, stem-clasping, much enlarged at the base, the lower ones pinnatifid, the upper ones sagittate; all are prickle-toothed, both sides smooth; size various. *Flowers* as in the last described species. Cattle are fond of it and it yields a milky juice on being wounded.

*LACTUCA. Schreb. gen. N.* 1234.

*Calyx* imbricated, cylindric, with a membranaceous margin. *Receptacle* naked. *Seeds* even, with a simple stipitate pappus.

L. *sativa. Willd.* iii. 1523.

*Leaves* rounded, cauline leaves cordate. *Stem* corymbed.

*Pers.* Kahoo.

*Arab.* Khuss.

Native place uncertain, but it is common in gardens in India, Persia, and the neighbouring countries, and like most of the plants of this class, succeeds best during the dry season.

*PRENANTHES. Schreb. gen. N.* 1236.

*Calyx* calycled. *Florets* in a single row. *Pappus* simple, sub-sessile. *Receptacle* naked.

1. P. *acaulis. Roxb.*

Herbaceous, stemless. *Leaves* radical, sessile, linear-lanceolar, smooth and entire. *Scape* four or five-flowered, much shorter than the leaves. *Florets* eight.



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A native of the interior parts of Bengal, from the district of Dinagepore Dr. Carey sent the plant to the Botanic garden at Calcutta, where it flowers in March and April.

*Root* perennial. *Stem* none, the top of the root, under the surface of the soil divides into several shoots, each of which produces a single small tuft of leaves from its apex. *Leaves* radical, sessile, linear-lanceolate, entire, very smooth, of a deep green on both sides; from four to six inches long, and less than half an inch broad. *Scapes* short, in general about an inch long, smooth, bearing from one to six alternate, yellow, pedicelled flowers. *Calyx* from six to eight-leaved, with a *calycle* of three or four ovate scales.

2. P. *procumbens. Roxb.*

Procumbent. *Leaves* mostly radical, linear, runcinate. *Racemes* terminal, flowers in rather remote fascicles. *Calyces* many-flowered.

A native of Bengal. It flowers during the hot season.

*Root* simple or somewhat branched, when broken discharging an orange-coloured sap, of a heavy, soporific smell; from their size, it may be supposed they are biennial or more. *Stem* none, but many, procumbent, dichotomous, smooth branches springing immediately from the root, from one to two feet long. *Leaves* chiefly radical, spreading flat on the earth, linear-runcinate, segments short, and rather obtuse; margins a little scabrous, with minute, spinous points, those of the branches less divided and even entire. *Racemes* ascending, terminal, as long as the rest of the plant below them. *Flowers* in rather remote fascicles, yellow. *Pedicels* nearly as long as the flowers, scaly, with small bractes. *Calyx* subcylindric, scales linear, with white membranaceous margins, and quickly decreasing into a calycle. *Florets* from twenty to thirty. *Pappus* simple, and sessile.

3. P. *asplenifolia. Willd.* iii. 1540.

Ascending, ramous, many-flowered. *Leaves* sessile, linear, pinnatifid, or runcinate, smooth.

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*Beng.* Teek-chana.

Common on the higher, cultivated, and uncultivated lands of Bengal. Flowering time the cold season. The same plant is also common on the sand hills near the sea along the Coromandel coast.

*Root* simple, biennial, if not perennial. *Stems* at the base stoloniferous, short, variously bent, dichotomous, smooth, many-flowered. *Leaves* mostly radical, and spreading flat on the ground, sub-sessile, pinnatifid, smooth; from two to three inches long. *Flowers* pretty large, of a bright yellow. *Calyx* the exterior leaflets small as if a calycle.

4. P. *racemosa. Roxb.*

Annual, ramous. *Leaves* runcinate, stem-clasping, finely-toothed. *Flowers* racemed, and in fascicles. *Peduncles*, and *pedicels* smooth.

A native of the coast of Coromandel, where it is found during the dry season, on road sides, and among rubbish.

*Leaves* approximate, stem-clasping, the lower ones runcinate, the superior ones cordate-sagittate, all are smooth, and finely prickle-toothed, size various. *Racemes* terminal, long, slender, jointed; *joints* remote, bracted, flower-bearing. *Flowers* small, yellow, placed at the joints of the racemes only. *Calyx* calycled, cylindric, scales of the tube about eight, those round its base many, small, and extending half way down the pedicels. Cattle are fond of it, and it is replete with the same kind of milky juice, common to these plants.

*SERRATULA. Schreb. gen. N.* 1264.

*Receptacle* naked. *Calyx* sub-cylindric, imbricated; *scales* pointed, but not hooked nor spinous. *Pappus* hairy.

1. S. *anthelmintica. R.*

Annual. *Leaves* broad-lanceolar, serrate. *Flowers* terminal, calyx squarrose. *Pappus* of hairy bristles.

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Vernonia *anthelmintica. Willd.* iii. 1634.

Cottu-shiragom. *Rheed. Mal.* ii. *t.* 24.

*Sans.* Somraj.

*Beng.* Somraj.

Conyza *anthelmintica. Linn.*

*Teling.* Shendoo-gella-kura.

Is a pretty large, erect, annual species, common on high dry uncultivated ground, and rubbish. It flowers during the cold season.

*Stem* erect, branchy, round, clouded with elevated purple spots, slightly downy, from two to three feet high. *Leaves* scattered, petioled, broad-lanceolate, grossly serrate, slightly downy, running down to the insertion of the petioles, size very various. *Flowers* terminal, peduncled. *Calyx ; leaflets* unequal, the exterior ones small, subulate, diverging ; the interior ones wedge-formed. *Florets* twenty or thirty, equal, all hermaphrodite. *Tube* curved ; *segments* of the border five, incurved. *Style* long, two-cleft. *Seeds* cylindric, crowned with hairs, or rather hairy soft bristles. *Receptacle* naked.

2. S. *cinerea. Roxb.*

Erect, annual. *Leaves* alternate, ovate-cordate, crenate, rugose. *Flowers* terminal, somewhat fastigiate; *pappus* hairy.

Conyza *cinerea. Willd.* iii. 1925.

*Beng.* Kookseem.

This plant is one of the most common in every part of India ; every soil and situation suits it, and it is in flower at all times of the year.

*Root* ramous, annual. *Stem* erect, ramous, round, a little downy and finely furrowed. *Leaves* alternate, petioled, ovate, and ovate-cordate, crenate, rugose, often waved, somewhat pubescent, decurrent to the base of the petioles, from one to three inches long. *Flowers* terminal, numerous, subfastigiate, small, purple coloured. *Florets* equal, all hermaphrodite. *Calyx* imbricate, with narrow-lanceolate acute downy scales. *Seeds* cylindric, white, hairy ; *pappus* hairy.

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The florets being constantly uniform, and all hermaphrodite, induce me to consider it a *Serratula* rather than a *Conyza.*

*Note.* A variety from China, has the flowers much larger and nearly round. The seeds are smooth, and only about half the number of rays in the pappus.

3. S. *carthamoides. Buch.*

Annual, erect, simple. *Leaves* sub-sessile, (not decurrent,) pinnatifid, serrate, hoary underneath. *Flowers* terminal, sub-panicled. *Calyx* ovate, with the lower scales carinated.

A native of Nepal; from thence Dr. Buchanan sent the seed to the Botanic garden at Calcutta in 1802, where the plants blossom, and ripen their seed from November till March.

*Stem* annual, erect, simple, slightly striated, and somewhat scabrous, height of the plants in the Botanic garden, from two to three feet. *Leaves* alternate, sub-sessile, not decurrent, pinnatifid, serrate, with the exterior segment ovate-lanceolate, and acute, the lateral ones linear-oblong and obtuse, pretty smooth above and hoary underneath; from two to four inches long. *Flowers* terminal, pedicelled, sub-panicled, small, of a rose-colour. *Calyx* ovate; *scales* numerous, imbricated, acute, the exterior ones have a sharp keel on the back. *Florets* all hermaphrodite; *pappus* plumose, sessile, many times longer than the seeds.

*CARDUUS. Schreb. gen. N.* 1254.

*Calyx* ovate, imbricated with thorny scales. *Receptacle* hairy.

1. C. *ramosus. Roxb.*

Annual, dichotomous. *Leaves* sessile, lanceolate, thorny, toothed, downy underneath. *Flowers* solitary, terminal. *Stigmas* hid within the anthers, and bearded at the base.

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This is rather a rare plant, growing on dry, cultivated lands after the crop is cut, during the cold season.

*Root* annual, simple, perpendicular. *Stem* short, flexuose, striated, ramous. *Branches* two-forked, like the stem; the whole plant from one to two feet high. *Leaves* scattered, sessile, not decurrent, lance-lyrate, thorny. *Flowers* terminal, peduncled, of a pale purple. *Florets* from twenty to thirty. *Style* shorter than the stamens. *Stigmas* two, hid within the anthers, erect, bearded at their base.

2. C. *radicans. Roxb.*

Annual, diffuse, rooting; the branches with rather sharp angles. *Leaves* sessile, cuneate, remotely but deeply serrate, smooth. *Flowers* terminal, solitary, spines of the calyx long, slender, inoffensive; *receptacle* chaffy.

A native of Mysore, where it grows on dry fields, from thence the seeds were sent by Dr. Buchanan to the Botanic garden, where the plants thrive luxuriantly, blossom during the rains, and ripen their seed in two and three months afterwards.

*Stem* scarcely any, but in this rich moist soil, numerous stout branches spreading all round to a considerable extent, emitting numerous roots from every part, which strike deep into the soil when the branch rests on it; *young shoots* angular from a continuation of the nerves of the leaves. *Leaves* alternate, approximate, sessile, almost stem-clasping, cuneate, glossy, serrate-dentate, having the margins and nerves somewhat scabrous, and the apices of the serratures ending in short soft spines, with numerous darker coloured minute cells visible on viewing them between the eye and the light, from one to four inches long. *Flowers* terminal, solitary, short-peduncled, of a middling size and lively lilac colour.

3. C. *lanatus.*

Erect. *Leaves* petioled, lance-lyre-shaped, thorny-toothed, woolly underneath. *Flowers* numerous, peduncled. *Stigmas* high above the anthers. *Pappus* hairy.

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Cnicus *lanatus. Willd.* iii. 1617.

A common annual, on cultivated spots in Bengal, during the cold season.

*Root* simple, crooked, annual. *Stem* erect, simple, or with a few spreading branches near the root, striated, round, clothed with a little wool, about two feet high. *Leaves* scattered, petioled, lyrate, or lanceolate-sinuate, with the margins much waved, toothed, the teeth armed with long sharp thorns, pale green on the upper side, covered with white wool on the under side, from three to six inches long. *Flowers* terminal, peduncled, large, pale, purple. *Florets* one hundred or more. *Anthers* half hid in the mouth of the tube. *Stigma* long, above the anthers; *sides* grooved; *apex* emarginate.

*CYNARA. Schreb. gen. N.* 1257.

*Calyx* dilated, imbricated with fleshy, emarginate scales with an acumen.

C. *Scolymus. Willd.* iii. 1691.

Perennial. *Leaves* somewhat spiny, pinnatifid. *Calycine scales* ovate.

*Arab.* Hirshuf.

*Hind.* Kungin.

Native place uncertain. Flowering time the cold season in the gardens of Hindoostan.

*CARTHAMUS. Schreb. gen. N.* 1261.

*Calyx* ovate, imbricated; *scales* thereof with foliaceous, sub-ovate apices.

C. *tinctorius. Willd.* iii. 1706.

Annual, erect, ramous. *Leaves* sessile, broad-lanceolate, serrate-aculeate.

Cnicus Indicus. *Rumph. Amb.* v. *t.* 79.



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*Sans.* Koosumbha.

*Beng.* Koosum.

Cultivated in many parts of India, during the cold season, not only for the use of the dyers, but for the oil obtained for the seed.

*SPILANTHUS. Schreb. gen. N.* 1266.

*Common calyx* erect, with leaflets numerous, sub-equal, oblong, the two exterior longer. *Pappus* of two bristles.

1. S. *Amella. Willd.* iii. 1713.

Annual. *Leaves* opposite, petioled, ovate, serrate. *Peduncles* long, one-flowered, florets equal.

A B C daria. *Rumph. Amb.* vi. *t.* 65.

*Teling.* Marata-tiga.

Verbisina *Amella. Linn. Sp.* ii. 1271.

Annual, a native of shady places. It flowers during the cold season.

*Stem* in young plants conspicuous, and erect, in those more advanced there is not any, but several branches with their lower ends resting on the ground and rooting at the joints, with about a foot of their extermities erect, ramifications opposite, or two-forked, with very long peduncled flowers in the cleft. *Leaves* opposite, petioled, the most general form is ovate, with the anterior margins very remotely, and grossly serrate, smooth, from one to four inches long, and from three-fourths of an inch, to three inches broad. *Peduncles* solitary in the divisions of the branches. *Flowers* yellow, conical. *Calyx*, the leaflets ciliate. *Corol*, the tube of the lower florets has a bend outwards to fit the next within; border from four to five-cleft. *Seeds* of the margins three-cornered, of the centre compressed, and two-horned. *Chaff* boat-formed.

2. S. *oleracea. Willd.* iii. 1715.

Annual, ramous. *Leaves* oval, grossly serrate.

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A native of Silhet. In the Botanic garden it is in flower and seed the whole year. The leaves are used as a pot-herb by the natives of that district.

*BIDENS. Schreb. gen. N.* 1267.

*Calyx* imbricated. *Corol* with sometimes a ligulate floret or two in the circumference. *Seed* crowned with straight, hispid, barbed awns. *Receptacle* chaffy.

1. B. *trifida. Buch.*

Annual, erect, smooth. *Leaves* opposite, three-parted, grossly serrate, smooth. *Flowers* solitary, peduncled; the exterior calyx twice the length of the flowers, its leaflets wedge-shaped. *Seeds* flat, cuneate, smooth, two-horned.

Found in Nepal by Dr. Buchanan, who sent the seeds to the Botanic garden, where the plants blossom during the dry season, but perish when the rains begin in June.

*Stem* erect, round, smooth, jointed. *Branches* opposite, and like the stem, but much shorter, height of the whole plant in the Botanic garden about one foot. *Leaves* opposite, on concave, winged petioles, simple, and three-parted, grossly serrate, smooth, the simple leaves or segments of the divided ones, nearly lanceolate, and obtuse. *Flowers* peduncled, solitary, terminal, erect. *Calyx* double, the *exterior leaflets* five, wedge-shaped, and nearly twice the length of the flower, the *inner* ones oblong, and rather shorter then the corollets. *Seeds* flat, wedge-shaped, smooth, without angles; horns two, rarely three, backwardly hispid, diverging.

*Note.* In Nepal Dr. Buchanan says the leaves were often bipinnate.

2. B. *bipinnata. Willd.* iii. *p.* 1725.

Annual. *Leaves* bipinnate, gashed and dentate-serrate. *Flowers* terminal. *Calyx* of from seven to nine simple, clavate, ciliate leaflets, from two to four neuter ligulate florets



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in the ray. *Seeds* numerous, diverging. The exterior chaff with ciliate apices.

A native of Bengal. It flowers during the rainy and cold seasons.

*CACALIA. Schreb. gen. N.* 1269.

*Receptacle* naked. *Pappus* hairy. *Calyx* cylindric, oblong, at the base only sub-calycled.

1. C. *bicolor. R.*

Perennial, spreading. The *inferior leaves* short-petioled, remotely serrate; the *superior* ones hastate-laciniate, purple underneath.

This elegant species was received into the Botanic garden from the Moluccas in 1798, and blossoms during the cold season.

*Stem* scarcely any; *branches* many, spreading in every direction, smooth and coloured when in an exposed situation. *Leaves* alternate, not succulent, the inferior ones short-petioled, lanceolate, remotely serrate; the superior ones stem-clasping, hastate-laciniate, smooth on both sides, underneath of a deep purple colour, particularly when the plant grows in a situation exposed to much sun-shine. *Flowers* terminal, large, of a deep orange colour. *Peduncles* long, one-flowered, with many sub-lanceolate scales. *Calyx* calycled.

This plant is highly ornamental when well exposed to the sun, the leaves are then of a deep purple colour on the under side. It grows readily from cuttings.

2. C. *reclinata. Roxb.*

Shrubby, smooth. *Branches* reclined. *Leaves* petioled, ovate-cordate, dentate-serrate. *Flowers* terminal. *Calyx* and *calycle* of about eight leaflets each, and with about twenty florets.

A native of the Islands in the Straits of Malacca.

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*Leaves* alternate, petioled, ovate-oblong, pointed, with the margins dentate-serrate, smooth on both sides and of a slender texture, from one to three inches long, and about one broad. *Petioles* short, channelled. *Flowers* terminal, somewhat umbelled, pretty large. *Calyx* about eight-leaved, nearly the length of the florets. *Calycle* about eight-leaved, many times shorter than the calyx. *Corol; florets* about twenty.

3. C. *sonchifolia. Willd.* iii. 1730.

Erect, annual, fistulous. *Leaves* lyrate, and sagittate, stem-clasping. *Flowers* umbelled.

Muel-schevi. *Rheed. Mal.* x. *t.* 68.

*Beng.* Sadi-modi.

An erect, branchy annual, a native of hedges, rubbish, &c. It flowers during the cold season.

*Stem* erect, flexuose, branchy, from two to three feet high, piped, smooth. *Leaves* stem-clasping, lyred, most slightly dentate, pretty smooth. *Umbellets* terminal, compound, many-flowered. *Flowers* small, of a bright purple colour. *Calyx* simple, from eight to twelve-toothed, from eight to twelve-striated. *Seed* five-seeded.

*ETHULIA. Schreb. gen. N.* 1271.

*Receptacle* naked. *Pappus* a membranaceous margin. *Calyx* equal.

E. *ramosa. Roxb.*

Ramous, erect. *Leaves* alternate, elliptic, serrate, smooth. *Flowers* peduncled, sub-corymbiform.

Introduced into the Botanic garden by seeds sent from the interior of Bengal, by Dr. William Carey. Flowering time the cold season.

*Root* annual, fibrous. *Stem* and *branches* nearly erect; general height of the whole plant, which is considerably ramous, about two feet, smooth in every part, and somewhat

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succulent. *Leaves* alternate, sub-sessile, elliptic, pretty smooth on both sides, serrate, from one to three or four inches long, and not quite half so broad. *Peduncles* opposite to the leaves, axillary, or terminal, each supporting many small, purple flowers, forming a very irregular corymb. *Calyx* imbricated; *leaflets* short. *Florets* numerous, of a light purple colour. *Seeds* sub-clavate, from four to five, or six-sided. *Pappus* none.

*EUPATORIUM. Schreb. gen. N.* 1272.

*Receptacle* naked. *Pappus* plumose. *Calyx* imbricated. *Style* semibifid, erect.

1. E. *divergens. Roxb.*

Shrubby, erect. *Branches* diverging. *Leaves* alternate, ventricose-oblong, recurved, serrate-dentate, rugose. *Corymbs* terminal. *Calyx* from five to eight-flowered.

A native of Mysore, from whence Dr. Buchanan sent the seeds to the Botanic garden in 1801, where the plants blossom during the cold season.

*Stem* erect, straight, from six to eight feet high, shrubby, round, covered with pretty smooth, dark brown bark. *Branches* numerous from the middle of the stem upwards, round, downy, and diverging. *Leaves* alternate, short-petioled, elliptic, recurved, serrate-dentate, rugose, while young downy, when old scabrous, from one to six inches long. *Corymbs* terminal, compound, or the whole upper half of the plants may be called one large panicle. *Flowers* very numerous, several together and sub-sessile, on short villous peduncles. *Calyx* sub-cylindric, imbricated, downy. *Florets* five or six, twice as long as the calyx, curved near the middle of the tube; at first purple, gradually becoming white, mouth of the tube campanulate; *segments* of the border narrow, sub-ensiform. *Stamens* and *style* erect. *Pappus* almost simple, twice as long as the calyx. *Receptacle* concave.

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*Note.* In 1810 found a plant with ten or twelve florets in the calyx.

2. E. *flexuosum. Willd.* iii. 1761.

Shrubby, erect. *Leaves* alternate, short-petioled, broad-lanceolate, remotely and grossly serrate, triple-nerved. *Corymbs* terminal.

A native of Flat Island near the Mauritius, where it was found by Colonel Hardwicke, in flower in May, who observes that the leaves are covered with a viscid juice and are used for green wounds as we use court plaster. The fresh flowers are highly aromatic, and the honey of Bourbon is strongly impregnated with the same flavour.

3. E. *asperum. R.*

Perennial, erect, harsh with short stiff hairs. *Leaves* alternate, sessile, cuneate-oblong, serrate. *Flowers* terminal, few but large. *Calyx* somewhat woolly, from twenty to thirty-flowered.

A native of Bengal, and like most of the order, flowers and ripens its seed during the dry season.

*AGERATUM. Schreb. gen. N.* 1273.

*Receptacle* naked. *Pappus* five-awned. *Calyx* oblong, sub-equal. *Florets* four or five-cleft.

1. A. *cordifolium. Roxb.*

*Leaves* opposite, cordate, serrate, hairy. *Flowers* sub-umbelled. *Florets* five-cleft.

*Beng.* Oochunti.

An annual found in the vicinity of Calcutta during the rainy and cold seasons; flowering time the cold season.

*Stems* erect, round, a little hairy. *Branches* opposite; height of the whole plant about two feet. *Leaves* opposite, petioled, cordate, serrate, hairy; size very various, the larger

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four or five inches long. *Flowers* very numerous, rather small, of a pale purple, terminating the plant in numerous, sub-globular umbellets, the whole forming a large, irregular, compound corymb. *Calyx*, scales lanceolate, pointed. *Seeds* black, with hispid angles. *Pappus* of five scales, with broader, cordate, serrate bases, ending in long subulate points, resembling the partial calyx of the orders *Polygamia Segregata*. *Receptacle* naked, hemispheric.

2. A. *aquaticum. Roxb.*

Annual. *Leaves* opposite, lanceolate, serrate. *Flowers* sub-umbelled. *Stigma* clubbed, twice the length of the florets.

*Beng.* Bura kesutee.

A native of the borders of rivulets among the Circar mountains. Flowering time the cold season.

*Stem* annual, somewhat succulent, below resting on the ground, above erect, round, very slightly hairy, from two to four feet long. *Leaves* opposite, decussated, petioled, horizontal, broad-lanceolate, serrate, smooth, somewhat succulent; from four to six inches long. *Flowers* terminal, forming an irregular, thin umbel, white. *Calyx* from twenty to thirty-leaved, equal. *Corol*, outside of the mouth woolly. *Stamens* within the tube. *Stigmas* twice as long as the corollets, erect, clubbed, white, they are a good and conspicuous mark. *Seeds* crowned with a glandular margin, from which issue three, four or five headed, pedicelled glands. *Receptacle* naked.

*Note.* By the structure of the stigmas, they being when full grown, far above the anthers, and the flowers all erect, it might be concluded the pollen could not reach them, but I could observe clearly that the anthers are ripe, and burst while the stigmas are of an equal length with and closely embraced by them, the stigmas continue to grow and carry with them a large portion of the dust; this wonderful economy I have frequently observed in a number of plants which at least helps to invalidate one of the old anti-sexualists' arguments.

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*ATHANASIA. Schreb. gen. N.* 1279.

*Calyx* imbricated. *Pappus* chaffy, very short. *Receptacle* chaffy.

1. A. *Indica. Roxb.*

Annual, straight, angular. *Leaves* alternate, sessile, lanceolar, serrate, smooth. *Corymbs* compound, terminal. *Stigmas* hid within the stamens.

*Teling.* Begati-Kunda.

Delights in high lands that have been lately in cultivation; in such situation it is not uncommon to see whole fields of it as thick as if they were sown by a careful farmer.

*Stem* annual, erect, angled from the insertion of the leaves, piped, smooth, from two to four feet high. *Leaves* sessile, lanceolar, serrate, smooth. *Corymbs* very large, decompound. *Flowers* pretty large, very numerous, of a purplish rose colour. *Florets* equal, generally five. *Style* shorter than the stamens. *Chaff* of the seeds, or *pappus* lanceolate; that of the receptacle linear lanceolate.

## SYNGENESIA SUPERFLUA.

*ARTIMISIA. Schreb. gen. N.* 1281.

*Receptacle* sub-villous, or nearly naked. *Pappus* none. *Calyx* imbricated with rounded, converging scales. *Florets* of the ray none.

1. A. *Moluccana. R.*

Shrubby, erect. *Leaves* multifid, smooth; *segments* filiform. *Flowers* globular, pedicelled, drooping. *Female florets* from six to eight in the circumference, two or three-toothed, with about as many five-toothed hermaphrodites in the centre.



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A native of the Molucca Islands; the branches and branchlets very numerous, smooth and drooping elegantly, with numerous minute flowers, pointing directly to the earth. *Scales* of the calyx roundish, membranaceous and smooth; the *receptacle* of the florets convex and naked.

2. A. *paniculata. Roxb.*

Shrubby, erect. *Leaves* from bipinnate to simple; *leaflets* linear, and often gashed. *Panicle* terminal, loose. *Flowers* long-pedicelled, erect; *florets* twenty, all tubular and five-toothed, about half of them are hermaphrodite; *receptacle* conical, naked.

The native place of this plant I cannot well ascertain. It was introduced into the Botanic garden from the interior parts of Bengal, and in three years it has only attained to the height of one or two feet, and is a very slender, sub-erect, flaccid, thinly branched, under shrub. Flowering time February.

*Leaves* alternate, petioled, from simple to pinnate, and bipinnatifid, being less divided towards the top, till they become simple amongst the flowers. *Leaflets* linear, often pinnatifid, or toothed, somewhat hoary, as are also the young shoots. *Panicle* terminal, composed of slender, alternate, sub-erect, leafy racemes. *Flowers* numerous, erect, small, sub-globular, yellow, generally one, rarely two, or three, on slender, filiform, axillary pedicels. *Calyx; leaflets* unequal, oblong, concave, villous. *Corollets* twenty or more; about half hermaphrodite in the centre, the other half female in the circumference; all are tubular with a five-cleft border. In the hermaphrodite ones the segments are recurved; in the female ones incurved. *Stigmas* very large, somewhat laciniate, and truncated. *Receptacle* conical, naked.

The smell of the plant is somewhat like that of *southernwood*, but less powerful.

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3. A. *Indica. Willd.* iii. 1846.

Herbaceous, erect. *Leaves* pinnatifid, villous underneath. *Panicles* terminal, flowers drooping, female florets ten, obliquely truncated, the hermaphrodite ones ten, with gibbous tubes; *receptacle* naked.

*Sans.* Dona, or Dana.

*Hind.* Gund-mar.

*Beng.* Dona.

*Pers.* Arlemasaya.

Is common in the gardens of the Hindoos throughout India. Flowering time the cold season.

*Root* ramous, perennial. *Stems* several, erect, sub-ligneous, sometimes biennial; base ramous, striated; tender parts villous; from four to eight feet high. *Leaves* alternate, pinnatifid, pretty smooth above, a little downy underneath, but not woolly and white as in A. *vulgaris; lobes* lanceolate, somewhat gashed, though generally entire. *Floral leaves* entire, and linear-lanceolate. *Panicles* terminal, with the ramifications and flowers all drooping. *Flowers* small, globular, numerous. *Hermaphrodite florets* about ten in the centre, five-cleft, with stamens hid in the gibbous tube. *Female* ones about the same number in the circumference, obliquely truncated, and so small as to be with difficulty distinguished from the style. *Receptacle* naked, convex.

The leaves possess a slightly aromatic smell and bitterish taste, similar to those of the common *Mugwort* which it resembles in habit, though not in the white woolly covering of the under side of the leaves nor in the inflorescence. The Hindoos employ it medicinally, and also in their religious ceremonies.

A. *vulgaris* is also a native of India, and common in gardens about Calcutta, where it is known to the Hindoos by the name *Nagadana*, which is also its Sanscrit appellation. It must also, I imagine, be a native of Japan, and China, as the one I have now described, (A. *indica*,) has not any of



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that soft white down on the under side of its leaves, of which the *moxa* is made in those countries.

4. A. *vulgaris. Willd.* iii. 1845.

Herbaceous, erect. *Leaves* pinnatifid, flat, gashed, tomentose underneath. *Racemes* simple, recurved. *Flowers* erect; ray five-flowered.

Naga or Naga dona, or Dona, its Sanscrit names, which are also its vulgar Hindoostanee, and Bengalee names. Found common in gardens in Bengal, where it flowers and ripens its seed during the dry season.

5. A. *parviflora. Buch.*

Herbaceous, with horizontal, slender branches. *Tender parts* hoary. *Leaves* simple, inferior, cuneate, with a dentate apex and some linear stipuliform segments at the base. *Flowers* ovate, drooping. *Hermaphrodite florets* about eight in the centre. *Female* ones three-toothed, and more numerous in the ray. *Receptacle* naked.

A native of Nepal, from thence the seeds were sent to this garden by Dr. Buchanan, where the plants blossom in May.

*Root* perennial. *Stem* ascending in an oblique direction. *Branches* many, spreading or drooping, very slender and slightly pubescent. *Branchlets* numerous, short, diverging, flower-bearing. *Leaves* sessile, wedge-shaped, with linear, stipuliform segments from the base, the inferior ones with a rounded, lobate-dentate apex; the superior ones with a three or five-cleft apex; those of the floral branchlets most minute and entire. *Flowers* numerous, pedicelled, very minute, ovate, drooping, green. *Calyx* of a few, large, (for the size of the flowers) oval leaflets. *Florets* from six to ten; *hermaphrodite* ones five-cleft in the centre, and more minute, obscurely three-toothed. *Female* ones in the ray. *Receptacle* convex, naked. The whole plant inodorous.

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6. A. *elegans. Roxb.*

Annual, erect, very ramous, smooth. *Leaves* of the young plants many-parted, of the old ones nearly simple, and fascicled, all are filiform, and smooth. *Racemes* panicled. *Flowers* globular, pedicelled, nodding. *Female florets* twelve in the ray, five-cleft.

This elegant plant was sometime ago received from General Martin at Lucknow, under the name *Abbuttna*, and is now, October, in full blossom in the Botanic garden; many have also been reared from seed sent by the same gentleman.

*Stem* while young straight, becoming less so by age and then woody. *Branches* numerous, expanding, with their extremities often nodding; whole height from three to six feet. *Leaves* on the stem of young plants multifid with the divisions filiform, and smooth; on old plants and flower-bearing branchlets fascicled, filiform, undivided, perfectly smooth, and very small, being only about a quarter or half an inch long, and as fine as a horse hair. *Flowers* numerous, pedicelled, small, yellow, round; the whole extremities of the branches forming elegant, nodding panicles, with the flowers pointing to the earth. *Calyx* of several roundish, smooth, concave scales. *Florets*, about twelve hermaphrodite ones in the disk, and nearly as many, small, five-cleft females in the circumference. *Style* in the hermaphrodite ones shorter than the florets, with a two-lobed, funnel-shaped *stigma* in the females longer than the florets, with the stigma two-cleft, and revolute.

The leaves, when bruised, emit a faint pleasant odour. The plant, particularly when young, is uncommonly elegant when in blossom, being then straight, with numerous spreading branches, the extremities thereof forming large, very ramous, nodding panicles, loaded with numerous, beautiful, most minute, drooping flowers.

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7. A. *carnifolia. Buch.*

Annual, erect, with simple, floriferous branches. *Leaves* decompound, smooth on both sides; *leaflets* ensiform. *Flowers* globose, drooping, both hermaphrodite and female florets numerous, the latter with gibbous, three-toothed corollets. *Receptacle* hemispheric, smooth.

A native of Nepal, from thence introduced by Dr. Buchanan into this garden, where the plants thrive well and blossom in March and April.

*Stems* erect, striated, smooth. *Branches* axillary, simple, reclined, floriferous; height of the whole plant rather under one foot. *Leaves*, the cauline decompound, or more, smooth on both sides, ultimate divisions ensiform, those of the branches from pinnatifid or pinnate to simple. *Flowers* solitary in the axill of the leaves of the branches, slender, peduncled, drooping, hemispheric, of a pale greenish yellow, the size of a grain of black pepper. *Calyx*, *leaflets* from oval to oblong, with broad, white, membranous margins. *Florets; hermaphrodite* numerous in the centre; *female* numerous in the circumference, with gibbous three-toothed margin. *Receptacle* hemispheric, smooth.

8. A. *madraspatana. Willd.*

Annual, procumbent. *Leaves* sessile, pinnatifid, downy; *peduncles* one-flowered. *Female florets* three-toothed.

Nelam-pata. *Rheed. Mal.* x. *t.* 49.

A native of dry lands that have been lately in cultivation. It flowers during the cold season.

Richard's description of this plant is so good, that I have only to add, that the seeds have a small, ciliate, campaniform crown.

9. A. *hemispherica. R.*

Annual, erect, ramous. *Leaves* pinnate; *leaflets* some sub-

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linear and others pinnatifid. *Flowers* solitary, peduncled, hemispheric. *Hermaphrodite florets* four-toothed; the *female* ones naked.

A small, erect, ramous annual, of short duration, appearing in dried up rice fields about Calcutta during the months of February and March.

*Root* of many, small, simple fibres. *Stem* erect, towards the apex ramous, round, smooth, except for a few, soft, woolly fibres; the whole height from six to eight inches. *Leaves* alternate, pinnate, nearly as long as the stem of the plant. *Leaflets* alternate, linear, toothed, gashed or pinnatifid. *Floral leaves* small and nearly simple. *Flowers* terminal, hemispheric, solitary, peduncled, with generally a small leaf about the middle of the peduncle, in the flowering time erect, afterwards bent to one side, drooping. *Calyx*, exterior leaflets largest. *Hermaphrodite florets* four-toothed, numerous in the centre; the *female* ones naked and more numerous in the circumference. *Receptacle*, the seeds from the hermaphrodite florets leave hollow pits thereon, whereas those of the female, leave sub-columnar elevations.

10. A. *sternutatoria. R.*

Annual, procumbent, woolly. *Leaves* sessile, wedge-shaped, dentate, downy underneath. *Flowers* axillary, sessile; *hermaphrodite florets* from ten to twelve, four-cleft; the *female* ones numerous, three-toothed. *Receptacle* naked.

*Beng.* Mechitta, also Nukh chiknee.

Appears with other syngeneseous plants during the latter part of the cold season, on cultivated land. The whole plant does not cover more than about six or eight inches in diameter, and is the smallest of the genus I have yet met with in India.

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*Root* simple. *Stems* several, branchy, pressing on the earth; all are somewhat woolly. *Leaves* numerous, sessile, wedge-shaped, deeply dentate, villous. *Flowers* axillary or in the divisions of the branches, solitary, sessile, sub-globular. *Hermaphrodite florets* from ten to twelve in the centre, with their border four-toothed, coloured, and expanding; the *female* ones very numerous in the circumference, most minute, with the border seemingly three-toothed, and the toothlets incurved. *Receptacle* naked.

It differs from A. *minima* in having sessile, downy leaves, and numerous flosculi in each flower. The minute seeds are used as a sternutatory by the Hindoos. I have often used them successfully myself.

*GNAPHALIUM. Schreb. gen. N.* 1282.

*Receptacle* naked. *Pappus* feathery (or simple.) *Calyx* imbricated, marginal scales rounded, scariose, coloured.

1. G. *strictum. Roxb.*

*Stem* straight, annual. *Leaves* alternate, sessile, linear, wedge-shaped, downy. *Spikes* compound, sub-panicled. *Florets* yellow, with white woolly calyx.

A small, annual species, growing in dry shady places during the cold season, where water has stood during the rains.

*Stem* straight, in a favourable soil, branchy, round, covered with soft, whitish down, about a foot long. *Leaves* sessile, linear, wedge-formed, or lanceolate, downy; size very various. *Spikes* glomerate, terminal, and from the superior axills. *Flowers* very small, the florets yellow, surrounded with the white, woolly, linear, acute scales of the calyx. *Receptacle* concave.

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2. G. *orixensis. Roxb.*

Annual, erect, simple. *Leaves* sessile, linear, wedge-shaped, downy. *Flowers* in sessile and peduncled heads. *Florets* yellow, with woolly calyx.

3. G. *multicaule. Willd. Sp. Pl.* iii. 1888.

Is a native of similar places with the former, also annual, and flowers during the same season.

*Stem* and *leaves* like those of G. *strictum*. *Flowers* also similar, but collected in several, small, terminal umbellets, or heads, which is the only specific difference.

4. G. *depressum. Roxb.*

Annual, procumbent. *Radical leaves* wedge-shaped; *cauline* ones sub-opposite. *Head* terminal, involved in white wool, and involucred. *Florets* yellow.

A very minute, prostrate annual; a native of the bottom of dried up ponds, in exposed situations.

*Stem* none. *Branches* many, prostrate, filiform, three or four inches long. *Leaves* few, sub-sessile, wedge-formed or lanceolate, woolly. *Flowers* exceedingly minute, collected in many, glomerate, terminal heads, surrounded with white, very woolly, leafy involucres. *Florets* yellow. *Female* numerous in the circumference; *hermaphrodite* from four to five in the centre.

5. G. *albo-luteum. R.*

Annual, ramous, sub-erect, woolly. *Leaves* half stem-clasping, woolly on both sides; the *inferior* ones sword-shaped. *Flowers* conglomerated.

A native of Boutan, and the banks of rivers issuing from that country. Flowering time the beginning of the hot season.

*Stem* ascending in a winding direction, with few or no branches, round and clothed with white, soft wool; whole height about one foot. *Leaves* half stem-clasping, the inferior ones wedge-shaped, and obtuse, above they are linear, or



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tapering to a point; all are covered with white down, particularly underneath, from one to two inches long. *Flowers* numerous, minute, yellow, collected on terminal fascicles, closely impacted together, the whole forming a tolerably regular corymb. *Calyx* woolly, chiefly the inferior parts. *Hermaphrodite florets* about four in the centre, with numerous three-toothed females in the circumference. *Pappus* from five to eight, simple hairs. *Receptacles* flat, naked.

*CONYZA. Schreb. gen. N.* 1286.

*Receptacle* naked. *Pappus* simple. *Calyx* imbricated, oblong. *Florets* of the ray female, and three-cleft.

1. C. *corymbosa. R.*

Shrubby. *Leaves* sub-sessile, obovate, serrulate. *Corymbs* compound. *Hermaphrodite florets* three; the *female* ones numerous in the ray.

A native of the Delta of the Ganges. Flowering time the end of the cold season.

*Stem* short, woody, erect, with numerous, ligneous, permanent, spreading branches; *bark* pretty smooth. *Leaves* alternate, sub-sessile, obovate, remotely and acutely serrulate, pretty smooth on both sides; from one to two inches long. *Corymbs* terminal, compound, dense, a little hairy. *Flowers* sub-cylindric, individually sessile. *Bractes* ovate, inserted round the apices of the common sub-divisions of the corymbs, and pressing on the calyx like a calycle. *Calyx* hairy. *Hermaphrodite florets* generally three in the centre, with numerous, three-toothed females in the circumference.

2. C. *pubigera. Willd.* iii. 1921.

Shrubby, sub-scandent. *Tender parts* downy. *Leaves* short-petioled, oblong, somewhat repand-dentate. *Flowers* terminal, on short, axillary, diverging branchlets.

Sonchus volubilis. *Rumph. Amb.* v. *t.* 103. *f.* 2. bad if intended for this plant, which is a native of the Moluccas.

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3. C. *balsamifera. Willd.* iii. 1924.

Shrubby, erect. *Leaves* lanceolate, unequally serrate, tomentose, at the base pinnatifid. *Corymbs* terminal; *flowers* sub-cylindric.

C. *odorata. Rumph. Amb.* vi. *t.* 24. *f.* 1. pretty good.

A native of the eastern parts of Bengal, from thence introduced into the Botanic garden at Calcutta, by Dr. Buchanan, where it grows to be a large shrub, with an erect, ligneous trunk, and branches covered with ash-coloured bark. Flowering time March and April.

*Leaves* alternate, short-petioled, lanceolate, irregularly serrate and generally more or less pinnatifid at the base, downy, particularly underneath, where they are sericeous and beautifully reticulated with numerous veins; from six to twelve inches long. *Petioles* short, often ornamented with one, two, three, or four, small leaflets. *Corymbs* terminal, numerous, bearing numerous, sub-cylindric, bright yellow flowers. *Hermaphrodite florets* numerous in the centre, the *female* ones numerous in the circumference.

The whole plant when bruised smells strongly of camphire.

4. C. *laciniata. Roxb.*

Annual, erect, ramous. *Leaves* downy, variously laciniated, with the margins curled, and acutely gash-toothletted. *Panicles* terminal; *flowers* conical.

A native of Bengal, where it appears and ripens its seeds during the cold season.

*Root* annual. *Stem* erect, ramous, particularly near the top, striated, villous. *Branches* expanding, height of the whole plant from two to five feet. *Leaves* alternate, sessile, downy on both sides, variously laciniate or pinnatifid, with the margins curled, acutely gash-toothletted and often ciliate, the floral ones, from two inches long, the lower or radical ones, six or eight inches long. *Panicles* terminal, erect. *Flowers* pedicelled, very numerous, yellow, conical. *Receptacle* convex.



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It differs from *lacera*, in having all the leaves laciniate and from *terebinthinacea* in the inflorescence and flowers. In this the panicle is expanded, and oval, and the flowers conical, in that corymbiform, and the flowers ovate.

5. C. *lacera. Burm. Ind.* 180. *t.* 59. *f.* 1.

Annual, erect. *Leaves* oval, sharp-toothed, downy. *Flowers* sub-umbelled.

*Beng.* Bura kooksoong.

Is a large ramous annual species, a native of dry pasture ground near hedges. Flowering during the cold season.

*Stem* erect, branchy, particularly near the ground. *Leaves* the lower, or rather the principal leaves of the stem are petioled, lyred; the superior ones simply oval, and many times smaller; all are sharp-toothed, pale green, downy, various in size. *Umbellets* terminal, and from the exterior axills pedunculed. *Flowers* a dull yellow.

The whole plant has a pretty strong smell of turpentine.

6. C. *aurita. Willd.* iii. 1929.

Annual, erect, ramous, covered with glutinous down. *Leaves* oblong, somewhat lyred, finely-toothed, downy. *Peduncles* terminal, bracted, one-flowered.

This species is also annual, a native of the same places with the former, flowering in the same season.

*Stem* erect, about two feet high, very ramous, round, covered with glutinous down. *Leaves*, the *inferior* ones large, petioled, oval, slightly lyred; the *superior* ones small, linear, sessile, runcinate; all are finely-toothletted, and covered with very soft, somewhat glutinous down; size very various. *Peduncles* terminal, bracted, downy, erect, one-flowered, the whole forming something like a large flattened panicle.

This species smells still stronger of turpentine than the last described, at the same time the smell is far from being disagreeable. These two promise to contain active principles, yet I cannot learn that they have ever been employed for any use. Cattle never taste either of them.

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7. C. *diffusa. R.*

Annual, erect, lower branches long, spreading, or drooping, downy. *Inferior* leaves sub-lyrate; *superior*, sessile, oblong, serrate-dentate. *Flowers* terminal.

A native of Bengal, where it appears during the dry season.

8. C. *fistulosa. Roxb.*

Annual, erect, fistulose, downy. *Leaves* sub-sessile, lanceolate, sinuous-toothed. *Spikes* sub-verticelled.

Annual, a native of dry ground near the mountainous parts of the coast. It flowers during the cold season.

*Stem* erect, from two to three feet high, piped, branchy, striated, downy. *Leaves* sub-sessile, broad-lanceolate, a little hairy, the lower ones sinuous-toothed; the *superior* ones irregularly toothed; size various. *Spikes* terminal, sub-verticelled, long, erect. *Flowers* numerous, pretty large, purple and yellow. *Female florets* numerous, minute, three-toothed. *Hermaphrodite* twenty in the centre.

9. C. *angustifolia. Roxb.*

Annual, erect. *Leaves* sessile, linear, entire, downy. *Panicles* terminal; *flowers* most numerous.

This plant is annual, and I have only met with it in the Company's Botanic garden; it does not appear to be a native of Bengal. I rather suspect the seed to have been accidentally brought in boxes of earth, with other plants from the Andamans.

*Stem* simple, erect, striated, somewhat scabrous, without branches till within a foot, or eighteen inches of the top, where there are several, forming a large oval panicle, the whole height of the plant from four to eight feet. *Leaves* alternate, sessile; those of the stem most remotely serrate, and reflected; those of the branches entire; all are linear-lanceolate, or linearly-clavate, and covered with short hairs; size very various. In the axills there are always several small leaves. *Flowers* most numerous, small, of a very pale yellow. *Pani-*

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*cles*, the whole top, or ramous part of the plant forms a single, large, diffuse one, of an oval form. *Calyx* hairy. *Hermaphrodite florets* about ten, or twelve, in the centre. The *female* ones numerous, in the circumference they are very minute and have the ligulate border three-toothed.

It is from a plant of this genus, or a *Baccharis*, Dr. Buchanan informed me that the natives of the Andaman Islands make their twine for fishing lines; and as the bark of this is strong, and peels off in long stripes, it may be the same.

10. C. *bifoliata. Willd.* iii. 1920.

Herbaceous, ascending, downy. *Radical leaves* short-petioled, the cauline ones sessile, all are serrated, dentate, and downy. *Peduncle* long, one-flowered, often with one or more leaf-like bractes near the middle.

An annual, a native of dry land, about hedges and road sides. It flowers during the cold season.

*Stems* or *branches* several, ascending, from nine to twenty-four inches high, round, downy. *Leaves*, the inferior ones large, short-petioled; the upper ones small, sessile, all are obovate-oblong, downy, serrate, serratures acute. *Flowers* many, terminal, long-peduncled, yellow. *Peduncles* filiform, straight, often leaf-bearing near the middle, the number in any plant is uncertain, but generally more than two. *Scales* of the calyx linear, hairy.

11. C. *pinnatifida. Buch.*

Shrubby, erect. *Leaves* from pinnatifid, and bipinnatifid on the stem, to linear, and nearly simple, amongst the flowers, soft and villous. *Corymbs* terminal, compound. *Flowers* oval, with about five hermaphrodite florets in the centre, and many female ones in the ray, all fertile.

A native of Nepal. It flowers in the cold season in the Botanic garden.

12. C. *alata. R.*

Shrubby; ramifications numerous and winged. *Leaves*

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linear-lanceolate, entire, decurrent. *Peduncles* terminal, becoming axillary, often winged, and then with a leaf near the solitary flower. *Calycine leaflets* subulate, the exterior ones recurved.

Found in Nepal by Dr. Buchanan, who sent the seeds to the Botanic garden where the plants blossom during the hot season.

13. C. *repanda. R.*

Annual, straight, ramous. *Leaves* stem-clasping, not decurrent, lanceolar, repand-denticulate. *Flowers* numerous, on the branchlets ovate.

From Pegu introduced into the Botanic garden where it appears about the close of the rains, flowering and ripening its seed from December till May.

*Root* annual. *Stem* straight to the top of the plant, from three to six feet high, slightly striated, and somewhat pubescent. *Branches* numerous, alternate, nearly erect, with alternate, simple or decompound, floriferous branchlets. *Leaves* alternate, stem-clasping, but not decurrent; those of the stem large, broad-lanceolate, tapering most toward the base, where they expand into two lobes, one on each side of the stem; the *margins* repand, and dentate, from six to ten inches long. Those of the branches and branchlets very small; all are harsh to the feel, and a little hairy. *Flowers* ovate, small, yellow, in little, rather remote, alternate fascicles, on the branchlets, some sessile, some short-peduncled. *Scales* of the *calyx* linear, with scariose, ciliate margins. *Corollets* from ten to twenty, five-toothed, hermaphrodite in the centre, numerous, and most slender, three-toothed females in the circumference. *Pappus* of simple white hairs. *Receptacle* flat, dotted.

14. C. *salicifolia. Willd.* iii. 1939.

Shrubby. *Leaves* linear-lanceolar, entire, downy underneath. *Corymbs* terminal, densely ramous. *Flowers* with one

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hermaphrodite floret in the centre, and many most slender females in the ray.

A native of the Mauritius, where it blossoms in September.

15. C. *lanceolaria. R.*

Perennial, erect, from four to six feet high. *Leaves* lanceolar, serrate, smooth; *petioles* sub-pinnatifid-winged, but not decurrent. *Flowers* panicled, sub-ovate.

Furmol, the vernacular name in Silhet, where it is indigenous and an article of the Materia Medica of that district. It flowers during the months of February and March, and the seed ripens in about two months.

*ERIGERON. Schreb. gen. N.* 1287.

*Receptacle* naked. *Pappus* hairy. *Florets* of the *ray* female, ligulate, and very narrow.

E. *asteroides. Roxb.*

Annual, hairy, and glutinous. *Branches* longer than the stem. *Leaves* oblong, gashed, downy. *Flowers* a few, terminal, peduncled; *florets* of the *ray* numerous, long and slender.

An annual, a native of dry cultivated lands. It flowers during the cold season.

*Stem* erect, from six to twelve inches high, ramous near the ground, round, hairy. *Branches* ascending, longer than the stem. *Leaves* alternate; the *inferior* ones short-petioled, oval or obovate, grossly-toothed; the *superior* ones sessile, oblong, sub-lyred; all are covered with soft down, and are somewhat glutinous. *Flowers* a few, terminal, peduncled, large, flat. *Hermaphrodite florets* of the disk yellow; the *female* ones ligulate; those of the border blue, generally entire, and only emarginate.

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*SENECIO. Schreb. gen. N.* 1290.

*Calyx* cylindrical, calycled, apices dead. *Receptacle* naked. *Pappus* simple. *Florets* of the disk male, of the ray female.

S. *Moluccana. R.*

Shrubby, erect. *Leaves* sessile, from cuneiform to elliptic, very remotely serrate-dentate. *Corymbs* terminal. *Corols* naked.

A native of the Molucca Islands.

*ASTER. Schreb. gen. N.* 1291.

*Receptacle* naked. *Pappus* simple. *Florets* of the ray ligulate and more than ten. *Calyx* imbricated; lower scales spreading.

1. A. *chinensis. Willd.* iii. 2038.

Annual, hairy. *Leaves* sub-oval, deeply serrate, or gashed, and ciliate with winged, stem-clasping petioles. *Flowers* terminal, solitary.

A. chenopodii folio, &c. *Dill. Elth. t.* 34. *f.* 38.

From Nepal, where it is indigenous, Dr. Buchanan sent the seed to the Botanic garden at Calcutta, under the name *Gaynatus*, which is its vernacular one in that country.

2. A. *trinervius. Roxb.*

Shrubby, scandent. *Leaves* sessile, entire, and serrate, three-nerved. *Panicle* terminal, thin.

A native of Nepal, from thence Dr. Buchanan sent the seeds to the Botanic garden, where the plant blossomed in November and December, when about two years old.

This handsome, shrubby species does not seem to require any further description than the above. The original plant did not produce ripe seed, and perished when three years old.



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*DORONICUM. Schreb. gen. N.* 1297.

*Receptacle* naked. *Calyx* imbricated. *Seeds* of the disk with a simple, hairy pappus; those of the ray naked.

D. *calcaratum. R.*

Annual, erect, ramous, and slender. *Leaves* stem-clasping, sagittate, serrate.

Jacobea perfoliata. *Burm. Zeyl. t.* 55. *f.* 2.

Inula *Indica. Willd.* iii. 2092.

*Teling.* Paleroopoo.

An annual, growing under the shade of trees, on an uncultivated dry soil. It flowers during the cold season.

*Stem* erect, ramous, round, coloured, a little hairy; from one to three feet high. *Leaves* stem-clasping, sagittate, irregularly serrate, somewhat downy. *Flowers* many, terminal, peduncled, pretty large, yellow. *Florets; female* of the ray tongued, linear, three-toothed, in the fissures of the mouth of the tube there stands a filiform recurved spur opposite to the tongue. This is an excellent specific mark. *Seeds* of the female florets, naked, smooth; those of the hermaphrodites hairy, and crowned with hairy pappus. *Receptacle* convex, naked.

*TAGETES. Schreb. gen. N.* 1302.

*Receptacle* naked. *Pappus* of five, erect awns. *Calyx* one-leaved, five-toothed. *Florets* of the ray four or five, permanent.

1. T. *patula. Willd.* iii. 2126.

Annual, ramous, spreading. *Leaves* lanceolate, ciliate-serrate.

*Pers.* Gool Jafree.

*Beng.* Genda.

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2. T. *erecta. Willd.* iii. 2127.

Annual, erect, ramous. *Leaves* lanceolate, ciliate-serrate. *Peduncles* naked, one-flowered.

*Beng.* Genda.

If originally from Mexico, like *Tobacco*, they have now become denizens of the East, and considered as indigenous, particularly in Persia and China. They blossom during the coolest season in the Botanic garden at Calcutta.

*ZINNIA. Schreb. gen. N.* 1304.

*Receptacle* chaffy. *Pappus* of two straight awns. *Calyx* sub-ovate, imbricate.

Z. *bidens. Retz. Obs.* v. 28.

*Leaves* pinnatifid. *Flowers* peduncled, hermaphrodite; *florets* four-cleft.

Is a rare plant on the coast of Coromandel, I have only found it amongst the Circar mountains during the rainy season, when it flowers.

*Root* woody, perennial. *Stem* erect, frequently ramous, and from six to eighteen inches high. *Leaves* radical, many, petioled, pinnatifid, smooth; *divisions* linear, those of the stem sub-sessile, otherwise they are like those of the root. *Flowers* a few, terminal, peduncled, small, yellow. *Calyx* simple, from eight to ten-leaved. *Hermaphrodite florets* of the *disk* from seven to twelve, four-cleft. *Female florets* of the *ray* from five to ten. *Stamens* four. *Seeds*, those of the ray shortest, all compressed, striated, and two-horned; *horns* straight, divaricate, acute, armed with short, stiff hairs pointing backwards, by these they adhere readily to whatever touches them.

*Note.* Willdenow has by some unaccountable mistake quoted Retzius's Z. *bidens*, which I know to be this plant, as I was with König when he first discovered and described



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it, for *Verbesina Boswellia*, a very ramous, cespitose plant; whereas this is rigidly erect.

### *CHRYSANTHEMUM. Schreb. gen. N.* 1307.

*Receptacle* naked. *Pappus* none. *Calyx* hemispherical, imbricated; the marginal scales membranaceous.

1. C. *Indicum. Willd.* iii. 2147.

Diffuse, perennial. *Leaves* variously divided. All the florets ligulate.

Tsjetti pu. *Rheed. Mal.* x. *t.* 44.

Matricaria Chinensis. *Rumph. Amb.* v. *t.* 91. *f.* 1. bad.

*Teling.* Chamunti.

Common in gardens all over India, where one name, Gooldaoodi of the Hindoos, serves for all the varieties. Flowering time the cold season.

2. C. *cuneatum. R.*

Perennial, diffuse, or creeping. *Leaves* sessile, wedge-shaped, deeply serrate, or gashed round the anterior margins. *Flowers* solitary, whitish; *scales* of the *calyx* cuneate, and ciliate.

A native of the Moluccas.

### *PYRETHRUM. Schreb.*

*Receptacle* naked. *Pappus* emarginate. *Calyx* hemispheric, imbricate. *Scales* rather acute, with scariose margins.

P. *Indicum. R.*

Annual, erect, ramous, glaucous. *Leaves* stem-clasping, pinnatifid. *Branches* one-flowered; *flowers* yellow, sometimes radiate.

A native of Bengal. In the Botanic garden it appears, flowers, ripens its seed, and perishes during the dry season.

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*Root* annual, ramous. *Stem* short, furnishing numerous, approximate, erect branches, particularly near the base, which are at first simple, but as the plants advance, they furnish a branchlet from the axill of each leaf; all are round, smooth, and glaucous; general height of the whole plant from one to two feet. *Leaves* alternate, one under each branch and branchlet, linear, stem-clasping, bipinnatifid, and pinnatifid; *segments* sometimes obtuse, others triflingly acute, from one to three inches long. *Flowers* large, of a lively yellow, solitary, on long terminal, round, glaucous, smooth peduncles. *Calyx; scales* oblong, imbricated; *margins* scariose. *Corol*, it is in general entirely composed of numerous, hermaphrodite, tubular, five-cleft florets; more rarely radiate with ligulate, three-toothed females. *Seeds* with a margin round the apex, which often projects inward like a hornlet. *Receptacle* convex, naked, dotted.

*MATRICARIA. Schreb. gen. N.* 1308.

*Calyx* hemispherical, imbricated; *marginal scales* solid. *Receptacle* naked. *Pappus* none.

M. *suaveolens. Willd.* iii. 2161.

Annual, erect, ramous. *Leaves* super-decompound, filiform; *ray* white; *disk* yellow. *Receptacle* conical.

A native of Hindoostan, and Persia. Flowering time the cold season in the Botanic garden.

*COTULA. Schreb. gen. N.* 1310.

*Receptacle* almost naked. *Pappus* marginate. *Florets* of the disk four-cleft; of the ray, scarcely any.

C. *sinapifolia. Buch.*

Annual, sub-erect. *Leaves* alternate, petioled, pinnatifid, or lyrate, serrate, hairy. *Flowers* floscular, small, sub-terminal, peduncled.

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A native of Nepal, from whence Dr. Buchanan sent the seeds to the Botanic garden at Calcutta, where the plants blossom in May.

*Stem* nearly erect, a little hairy, succulent, with few ascending branches; height of our plants at Calcutta, from six to twelve inches. *Leaves* alternate, petioled, pinnatifid, serrate, rugose, a little hairy, and harsh to the feel. *Flowers* peduncled, terminal, several together, small, globular, in the centre yellow, in the ray silver-coloured. *Calyx* from twelve to sixteen-leaved. *Florets* of the centre hermaphrodite, yellow, four-cleft; those of the ray female, more numerous, white, smaller, and two or three-toothed. *Receptacle* hemispheric, naked. *Seeds* crowned with a callous margin, and often with two small, tender bristles.

*ECLIPTA. Schreb. gen. N.* 1316.

*Receptacle* chaffy. *Pappus* none. *Florets* of the *disk* hermaphrodite and four-cleft; those of the ray female, and ligulate.

E. *prostrata. Willd.* iii. 2218.

Annual, scabrous, from erect, to prostate. *Leaves* opposite, sub-sessile, lanceolate, serrate. *Peduncles* axillary, one, two, or three together, one-flowered. *Seeds* scabrous.

Ecliptica. *Rumph. Amb.* vi. *t.* 18. *f.* 2.

*Beng.* Kesuti, or Keysuria.

Cajenneam. *Rheed. Mal.* x. *t.* 41. tolerable for a young luxuriant plant.

Eupatoriophalacron, &c. *Dill. Elth. t.* 113. *f.* 137, 138.

Verbesina *prostrata*, and *alba. Sp. Pl.* 1272. and I suspect E. *erecta*, *punctata*, and *prostrata*, are only one and the same species, or at most but accidental varieties, from age, soil, and situation; at least I have never found any other in India to compare with them.

Very common in India, and in blossom all the year, which is uncommon in this class.

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In tattooing, the natives after puncturing the skin, rub the juicy green leaves of this plant over the part; which gives the desired indelible colour, viz. a deep bluish black.

*SIEGESBECKIA. Schreb. gen. N.* 1320.

*Receptacle* chaffy. *Pappus* none; *exterior calyx* five-leaved.

1. S. *orientalis. Willd.* iii. 2219.

Annual, erect; *branches* dichotomous or trichotomous. *Leaves* opposite, from triangularly ovate, to lanceolate, the larger obtusely laciniate. *Peduncles* from the fork of the branches, one-flowered.

A native of the Moluccas.

This has the inversely pyramidal, tubercled, brown, bald seed of Gærtner's plant, which induces me to think it is his, though the leaves do not agree.

2. S. *brachiata. Roxb.*

Annual, erect, brachiate, ultimately dichotomous. *Leaves* opposite, petioled, triangularly cordate, grossly serrate. *Calyx* longer than the florets.

An annual, a native of the moist vallies among the Circar mountains. Flowering time the cold season.

*Stem* erect, round, piped, branchy, downy. *Branches* cross-armed, stem-like; the whole height about four feet. *Leaves* opposite, petioled, cordate, coarsely serrate, running down the petiole, very soft, downy; the longer ones are from four to five inches long, and three broad. *Flowers* terminal, small, yellow. *Leaflets* of the common exterior calyx, wedge-formed, increasing in length till the seeds are ripe; on the outside they have simple hairs; and on the inside they end in green glutinous bulbs. *Hermaphrodite florets* ten, shorter than the calyx; five of which stand in the disk; the other five stand alternate with the five female florets in the ray.

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There is no other interior calyx than the obtuse, boat-like chaff of the receptacle; their number is equal to that of the female florets which they embrace, they are covered on the outside with hairs, each ending in a green glutinous bulb.

*VERBESINA. Schreb. gen. N.* 1317.

*Receptacle* chaffy. *Pappus* awned, or none. *Calyx* simple, or in a double order.

1. V. *calendulacea. Willd.* iii. 2226.

Perennial, creeping. *Leaves* opposite, broad-lanceolate, serrate. *Peduncles* very long, one-flowered. *Calyx* five-leaved. *Female florets* eleven.

*Beng.* Bangra.

Pee-cajoni. *Rheed. Mal.* x. *t.* 42.

Caltha, &c. *Burm. Zeyl. t.* 22. *f.* 1.

Grows amongst bushes or wet lands near Calcutta. Flowering during the rains.

*Stems* annual, creeping, or climbing; *branchlets* sub-erect, round, somewhat scabrous, from one to four feet long. *Leaves* opposite, sessile, broad-lanceolate, sometimes most slightly and remotely serrate, on both sides scattered with short, stiff, white hairs issuing from dark green pits, from two to four inches long. *Peduncles* axillary, solitary, longer than the leaves, erect, round, a little hairy, one-flowered. *Flowers* pretty large, of a bright yellow. *Calyx* five-leaved. *Hermaphrodite florets* from twenty to thirty. *Female* ones from ten to fifteen, with their apices three-toothed. *Seeds* angular, crowned with a variously divided coronet. *Receptacles* convex, chaffy; *chaff* lanceolate.

The plant is void of smell, but has a slight terebinthenaceous taste.

2. V. *biflora. Willd.* iii. 2226.

Erect, annual. *Leaves* opposite, petioled, ovate-lanceolate,

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serrate. *Flowers* terminal, three-fold; the middle one often sessile. *Calyx* many-leaved.

Vallia-manga-mari. *Rheed. Mal.* x. *t.* 40.

A native of various parts of India. It flowers in the cold season.

3. V. *scandens. Roxb.*

Perennial, scandent. *Leaves* opposite, petioled, cordate, serrate, three-nerved. *Flowers* terminal, tern, and solitary. *Calyx* double. *Female florets* eight.

*Beng.* Bim-raj.

Is perennial, a native of hedges, uncultivated places, &c. about Calcutta. It flowers during the rainy and cold seasons. *Stem* long, straggling, or climbing, often as thick as the little finger, smooth. *Branches* opposite, somewhat four-sided. *Leaves* opposite, petioled, cordate, serrate, pointed, three-nerved, a little hairy, particularly the nerves, from two to four inches long. *Petioles* channelled, half the length of the leaves. *Peduncles* terminal, generally three-fold, erect, the lateral ones three-flowered, white, that of the centre has only one. *Flowers* pretty large, of a bright yellow. *Florets*, about twenty *hermaphrodite* ones, and eight or ten *female* ones with their apices two or three-toothed. *Seeds* turbinate, angular, scabrous. *Receptacle* chaffy, a little convex; the *chaff* wedge-formed, concave, hairy.

This plant, like the last, has no smell; but tastes slightly terebinthaceous.

4. V. *sativa. Roxb.*

Annual, erect, hispid. *Leaves* opposite, stem-clasping, cordate-lanceolate, serrate. *Flowers* terminal, long-peduncled, two or three-fold.

Karamdoo of the inhabitants of the Mysore country, where the plant is cultivated in the fields for its seed, from which an oil is expressed, and used as a substitute for the common sesamum oil. It is also cultivated in the vicinity of Nagpore,



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and in various other parts of India, for the same purpose. In 1800, the seeds were received into the Botanic garden from H. Colebrooke, Esq. the resident at the Court of the Berar Raja, and from Mr. Heyne at Bangalore.

The usual season for cultivating this plant, is during the cool months, between October and March.

*Stem* annual, erect, round, harsh, with white, slender, curved bristles. *Branches* opposite, expanding; the height of the whole plant, in a good soil, about three feet; the parts exposed to the sun tinged with purple. *Leaves* opposite, stem-clasping, linear-lanceolate, with cordate, almost perfoliate bases, remotely serrate, somewhat harsh but not so much so as the stem and branches; from four to six inches long, and from one to two broad at the base. *Peduncles* terminal, generally two or three together, though sometimes solitary, one-flowered, round, hairy; from three to six inches long. *Flowers* large, beautiful, of a bright lively yellow, inodorous. *Calyx* common, simple, five-leaved; *leaflets* ovate, villous. *Hermaphrodite florets* numerous in the centre, five-toothed. *Female florets* about eight or ten in the circumference, broad tongue-shaped, three-toothed. *Seeds* of both the hermaphrodite and female florets smooth, dark, of a blackish brown colour, nearly four-sided, with the angles rounded and tapering to the base. *Receptacle* convex, chaffy. *Chaff* concave, one to each floret embracing the exterior side of the seed. Those of the female florets larger.

5. V. *Lavenia. Fl. Zeyl.* 310.

Annual, erect, hairy. *Leaves* opposite, and alternate, petioled, from cordate to oblong, three-nerved, serrate, hairy. *Seeds* of the disk two-horned, those of the ray three.

*Lavenia erecta. Willd.* iii. 1724.

Pu-tumba, *Rheed. Mal.* x. *t.* 63. a bad figure, and that of *Burman's Zeyl. t.* 42. is still worse.

An annual, a native of dry rubbish, and lands that have lately been in cultivation. It flowers most part of the year.

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*Stem* erect, round, hispid, branchy; the whole plant two or three feet high. *Branches* below opposite, above often alternate, or two-forked. *Leaves* short-petioled, opposite or alternate with the branches, in young luxuriant plants cordate, in others oblong, or broad-lanceolate, pointed, three-nerved, serrate, scabrous and downy; size very various. *Peduncles* solitary, leaf-opposed or in the divisions of the branches, round, scabrous, one-flowered. *Flowers* small, white. *Calyx* common, simple, five-leaved. *Hermaphrodite florets* from ten to fifteen in the disk; and five female ones in the ray. *Seeds* of the ray three-horned, and three-sided; those of the disk compressed and two-horned. *Chaff* of the *receptacle* linear; *apex* from three to four-toothed.

This has a faint, pleasant, aromatic smell.

6. V. *Boswellia. Willd.* iii. 2225.

Annual, cespitose. *Leaves* alternate, and divided into numerous capillary segments.

A native of Coromandel, where it appears on low sandy moist ground during the dry season.

Willdenow considers *Zinnia bidens* (*Retz. Obs.* vi. 28.) to be this plant. It is very different, and according to my idea, a very perfect *Zinnia*, with a herbaceous, rigidly erect stem, and pinnatifid leaves; whereas this lies flat on the ground, and leaves bi- and tripinnate.

## SYNGENESIA FRUSTRANEA.

### *HELIANTHUS. Schreb. gen. N.* 1322.

*Calyx* imbricate, somewhat squarrose. *Pappus* two-leaved. *Receptacle* chaffy, flat.

H. *annuus. Willd.* iii. 2237.

All the leaves cordate, three-nerved. *Peduncles* thickening. *Flowers* drooping.



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*Beng.* Soorja mookee.

*Pers.* Gooli-aftab.

Of this we have several varieties from China, and Persia, and although originally from Peru, it may now without much impropriety, be inserted here, as an Indian plant.

*CENTAUREA. Schreb. gen. N.* 1331.

*Calyx* imbricate. *Florets* of the ray funnel-formed, longer and irregular. *Receptacle* bristly. *Pappus* simple.

1. C. *moschata. Willd.* iii. 2278.

*Calyx* with roundish-ovate, smooth scale. *Leaves* lyrate-toothed.

*Hind.* Shah-pusund.

In gardens all over India, where it flowers during the cold season, and is considered a native of Persia.

2. C. *lanata. Roxb.*

Annual, ramous, woolly. The *inferior leaves* petioled and sub-pinnatifid; the *superior* ones, sessile, lanceolar. *Scales* of the *calyx* with scariose pectinate margins.

Found by Richard Pierard, Esq. on a mountain in the vicinity of Hurdwar. From the specimens collected by that gentleman, seeds were obtained which produced abundance of plants in this garden which blossomed in April and May.

*Stem* erect, soon dividing into many, alternate, sub-erect, somewhat angular, woolly branches; the whole height from twelve to eighteen inches. *Leaves* numerous, approximate, the inferior ones petioled and pinnatifid; the superior ones sessile, lanceolar and linear-oblong, about the middle of the plant they are remotely denticulate, while those near the flowers are entire, all are woolly on both surfaces; from two to six inches long. *Peduncles* terminal, solitary, short, one-flowered; size and colour of the flowers nearly as in C. *cyanus*. *Scales* of the calyx oblong, with a broad, scariose,

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pectinate border round the anterior margins. *Neuter florets* from eight to ten, with a filiform, long, curved tube. *Seeds* oblong, smooth. *Pappus* bristly in the circumference, chaffy in the centre. *Receptacle* bristly.

## SYNGENESIA SEGREGATA.

### *ELEPHANTOPUS. Schreb. gen. N.* 1347.

*Partial perianth* four-flowered. *Florets* tubular, hermaphrodite. *Receptacle* naked. *Pappus* bristly.

E. *scaber. Willd.* iii. 2389.

Herbaceous. *Leaves* chiefly radical, sessile, oblong, very hairy. *Heads* peduncled and sessile. *Involucre* three-leaved, many-flowered.

Ana schovadi. *Rheed. Mal.* x. *p.* 13. *t.* 7.

*Beng.* Samdullum.

A native of the warmer parts of India, delighting in a dry elevated soil; flowering time the cold season.

*Root* fibrous, biennial or more. *Stem* erect, rigid, ramous, round, hairy, about one foot high, and as thick as a stout quill. *Leaves* chiefly radical, half stem-clasping, spreading flat on the surface of the earth, oblong, wrinkled, crenulate, very hairy. The cauline leaves are few, much smaller, and at the insertion of the branches only. *Heads* solitary, terminal on long peduncles with a sessile one at the base of each of the long peduncles. *Involucre*, or common perianth of three sessile, cordate, hairy leaflets, embracing numerous fascicles of corollets. *Perianth, partial*, many-leaved, four-flowered. *Florets* tubular; the *hermaphrodite* ones pale red. *Pappus* of five hairy bristles.

### *SPHÆRANTHUS. Schreb. gen. N.* 1352.

*Partial perianth* eight-flowered. *Florets* tubular, a few

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hermaphrodite ones are mixed with more obscure females. *Receptacle* scaly. *Pappus* none.

1. S. *mollis. R.*

Annual, winged. *Leaves* sessile, decurrent, long-obovate, bristle-serrate, downy and glutinous. *Peduncles* as long as the leaves; *scales* of the *perianth* lanceolate, and ciliate. *Female florets* fiilform.

Adaca-manjen. *Rheed. Mal.* x. *t.* 43.

An annual, a native of dry land that has been lately in cultivation. It flowers during the cold season.

*Stem* scarcely any, but many expanding, dichotomous, winged branches; these wings are irregularly toothed and take their rise from the insertions of the leaves; the whole plant is from one to two feet high. *Leaves* sessile, decurrent, oblong, obtuse, bristle-serrate, covered on both sides with soft, glutinous down. *Flowers* solitary, leaf-opposed, or terminal, peduncled, globular, rose-coloured, or inclining to purple. *Peduncles* winged, branch-like. *Calyx, perianthium, common* scarcely any; *partial* one many-leaved; *leaflets* linear-lanceolate, and ciliate.

This plant is remarkably fragrant; it certainly might be applied to valuable purposes in medicine.

2. S. *Indicus. Willd.* iii. 2394.

Annual, winged. *Leaves* lanceolate, decurrent, serrate, villous. *Peduncles* short, winged; *scales* of the proper perianth cuneate, and smooth. *Female florets* about fifteen, and gibbous.

A native of Bengal, where it flowers in the cold season. This species is perfectly inodorous, whereas S. *mollis* is very fragrant.

*ECHINOPS. Schreb. gen. N.* 1353.

*Partial perianth* one-flowered. *Florets* tubular, hermaphrodite. *Receptacle* bristly. *Pappus* obscure.

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E. *echinatus. Roxb.*

Annual, ramous, spreading. *Heads* globular, spinous. *Partial perianth* double;- the *exterior* one imbricated, many-leaved; the *interior* one-leaved, five-cleft.

A native of Mysore, from thence Dr. Buchanan sent the seed to the Botanic garden at Calcutta, where the plants thrive luxuriantly, and blossom about the beginning of the hot season in February and March.

*Root* annual. *Stem* scarcely any, but many, dichotomous, round, villous branches spreading in every direction; height of the luxuriant plants in the Botanic garden, not more than two feet, but covering an extent of ground fully twice that in diameter. *Leaves* stem-clasping, runcinate, spinous-toothed, villous above, and tomentose, or cottony underneath. *Heads* of flowers terminal, solitary, globular, white. *Common perianth* of several, totally reflexed, spatulate, laciniate, ciliate, permanent scales. *Proper perianth* double, one-flowered; the *exterior* one of several, acute, imbricated scales, surrounded with much long hair, here and there one of the scales ending in a long, straight, simple spine, which projects a little beyond the flowers; the *inner* or *proper perianth*, one-leaved. *Tube* gibbous. *Border* five-parted; division unequal, and ciliate. *Florets, tube* cylindric; *divisions* of the border revolute. *Seeds* hairy, enclosed in the tube of the inner proper perianth. *Receptacle* globular, naked.

*CESULIA. R.*

*Calyx* common, many-leaved. *Partial perianth* one-leaved, one-flowered. *Florets* tubular, hermaphrodite. *Receptacle* naked. *Pappus* none.

C. *axillaris. Willd.* iii. 1796. *Corom. pl.* 1. *N.* 93.

Annual, creeping near the base. *Leaves* alternate, lanceolate, serrate. *Flowers* axillary, sessile.

I may say triple, if the large quantity of long white hair which surrounds the many-leaved, imbricated one, can be so called.

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A native of moist places. It flowers during the wet season.

*Stems* annual, towards the base creeping, and branchy, above erect, round, smooth, the erect parts from nine to fifteen inches high. *Leaves* alternate, stem-clasping, lanceolate, serrate, smooth, with the base much expanded, so as to form a cup-like receptacle for the flower. *Flowers* axillary, single, sessile, of a beautiful light purple. *Common perianth* many-leaved, unequal; the exterior two or three that are placed on the sides, are the largest, and end like a leaf. *Partial perianth* one-flowered, one-leaved, campanulate, smooth, contracted, margin two-cleft, permanent. *Corol* compound. *Florets* numerous, all hermaphrodite, equal; *tube* longer than the perianth; *border* five-cleft, spreading. *Filaments* five, as in the class. *Germ* ovate. *Stigma* two-cleft. *Pericarp* none, the belly of the partial perianth closely enveloping each seed, and forming its exterior covering. *Seed* one, wedge-formed, somewhat four-sided, crowned with the two divisions of the mouth of the partial perianth.

I believe Dr. König never saw this plant, to me it seems as if it would form a new genus.

## *HINGTSHA. R.*

*Calyx, common* four-leaved. *Partial perianth* one-leaved, one-flowered. *Florets* hermaphrodite, tubular, five-cleft in the disk; the *female* ones sub-ligulate, from three to four-toothed in the ray. *Receptacle* naked. *Pappus* none.

H. *repens. Roxb.*

*Beng.* Hingtsha.

A native of Bengal, delighting in a moist rich soil, and often extending itself considerably over the surface of the adjoining pools of water. Flowering time the cold and hot seasons.

*Stems* creeping, ramous, round, hairy, jointed; length very various; they appear to be perennial. *Leaves* opposite,

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stem-clasping, linear lanceolate, remotely serrate, a few distinct, woolly hairs over the under side of the nerve chiefly, and marked with numerous glands; from one to two inches long. *Flowers* solitary, sessile, terminal, or in the divisions of the branchlets. *Calyx, common*, four-leaved, leaflets cordate, obtuse, the interior pair smaller, all are entire, smooth, fleshy and permanent. The *partial calyx* one-leaved, spathiform, enveloping the germ, open on the inside, where the margins overlap each other; mouth contracted, ciliate and divided. *Corol* compound, uniform, convex. *Florets* hermaphrodite, many in the disk; the female ones margin the circumference; the hermaphrodite ones funnel-shaped, five-cleft; the females sub-ligulate, the inner fissure being much deeper; *border* very short, from three to four-toothed. *Stamens* in the hermaphrodite florets five, the anthers coalesced. *Pistil* in all the germs oblong, and the stigma two-cleft. *Pericarpium* none, the calyx unchanged envelopes the oblong, smooth, black seed, which is destitute of crown or pappus. *Receptacle* flat, naked.

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# CLASS XX.

## GYNANDRIA MONANDRIA.

*ORCHIS. Schreb. gen. N.* ——

*Nectary* horn-shaped behind the flower.

1. O. *platyphyllos. Willd.* iv. 11.

*Bulbs* undivided; *lip* of the nectary roundish, three-parted; *middle divisions* lanceolate, horn twice the length of the germ. *Leaves* oval, spreading close on the surface of the earth. *Racemes* erect.

2. O. *plantaginea. Corom. pl.* 1. *N.* 37.

A native of moist vallies among the Circar hills. Flowering in the rainy season.

*Root* a bulb, perennial, generally single, undivided, ovate, of the size of a pigeon's egg, with a few fungous, villous fibres issuing from the base of the scape near its insertion in the top of the bulb. *Leaves* from four to eight, radical, pressing on the earth, broad, oval, smooth, of a deep shining green, fleshy, slightly marked with many nerves, about four inches long, and three broad. *Scape* erect, about a foot, or a foot and a half high, including the flower-bearing part, as thick as a goose-quill, round, smooth; at every inch and a half or two inches, there is a lanceolate, foliaceous sheath. *Spike* from four to six inches long, every where surrounded with flowers. *Flowers* numerous, single-bracted, white, fragrant. *Bractes* single, one-flowered, lanceolate, nerved, as long as the germ. *Corol*, three exterior petals nearly equal;

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two interior, small, obliquely oblong, erect, forming a dome over the anthers. *Nectary, upper lip* short; the *under* one three-parted, middle division long, narrow-pointed, recurved. *Horn* nearly twice the length of the germ.

3. O. *commelinæfolia. R.*

*Lip* three-parted. *Segments* filiform; *horn* filiform, twice the length of the long taper-pointed germ; *tubers* from two to four, fusiform, thin, leafy; *leaves* lanceolate, sheathing.

An erect plant, about eighteen inches high; a native of the northern parts of Bengal, from thence introduced into the Botanic garden, where it blossoms in August, which is the middle of the rainy season.

*Root* consisting of two, three, or four fusiform, succulent, pale tubers, and fleshy fibres. *Stem* erect, simple, including the floriferous part, about a foot and a half round, smooth, jointed, as thick as a slender quill. *Leaves* alternate, lanceolate, shining, the largest about six inches long, by one broad, decreasing gradually into bractes in the spike, where they end, long, slender, and sharp. *Sheaths* cylindric, about half the length of the joints of the stem. *Flowers* many, scattered round the last five or six inches of the plant, pretty large, white, and inodorous. *Corol (calyx*, Swartz,) exterior and inferior lateral two petals semi-cordate, reflexed, ribbed; the *upper one* vaulted; the interior two unequally oblong. *Lip*, at the base a short, linear, undivided part, the rest consisting of three, nearly equal, long, filiform segments, the middle one projecting downwards and backwards, the lateral two diverging. *Horn* generally more than twice the length of the germ, filiform, with a clavate apex, green and variously curved. *Column* of the fructification short, protruding two long acute horns forward, into their fine extreme points. The proper filaments are inserted, and until expansion remain hid in a very fine groove along their upper edge. *Anthers* ovate, before expansion lodged between the thin folds of the



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column near its apex. *Stigma*, a clammy pit behind a linguiform process rising from the upper edge of the entrance into the horn. *Germ* oblong, groove long, taper-pointed.

4. O. *uniflora. R.*

*Lip* obcordate; the entire petals spreading; the inner two sub-rotund; *horn* filiform, three times the length of the germ. *Leaves* about two, lanceolar, three-nerved. *Peduncle* terminal, one-flowered.

A native of cool shaded moist spots amongst the Garrow hills, where it blossoms in September. The whole plant scarcely rises to six inches.

## *PTERYGODIUM. Swartz.*

*Corol* five-petalled, sub-ringent; the *upper* three petals vaulted, the lower two spreading. *Lip* inserted on the style, between the cells of the anthers. *Stigma* behind.

P. *sulcata. R.*

*Root* ramous, *bulbs* branchy, sub-cylindric. *Stems* leafy; the *lower leaves* ensiform. *Helmet* of the *corol* bagged behind; *lip* with a long claw and uniform lamina.

*Beng.* Shwet hoolee.

It is said there is a red and blue hoolee, neither of which I have yet seen. This white variety is a native of pasture ground near Calcutta; appearing during the latter part of the cold season only, about six or eight inches in height.

*Roots* consisting of several, pretty long, fleshy fibres. *Stem* leafy, erect, round, smooth. *Leaves* scattered, sword-shaped, with vaginated bases, entire, smooth, shorter than the stem. *Spike* oblong, crowded with numerous, small, white flowers. *Bractes* broad-lanceolate, the length of the germs. *Corol*, the three upper petals forming an helmet, of which the superior one is incumbent, and formed into a bag behind. *Nectary* sub-cylindric, near the base are two small, membrana-

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ceous, incurved lobes; grooved both above and underneath; the *apex* or *lamina* entire, reniform, yellow; before and after the time of blossoming it appears as if of two incurved, fleshy lobes.

### *EPIPACTIS. Swartz.*

*Corol* five-petalled, spreading. *Lip* without horn. *Anther* operculate, persistent. *Pollen* granulate.

1. E. *Juliana. Roxb.*

*Root* a single, simple, globular, white bulb; *leaf* radical, solitary, cordate, seven-nerved. *Scape* one-flowered. *Lip* with two small falcate lobes at the base. *Lamina* rhombiform, and entire. *Capsules* six-winged.

A delicate, small plant, found in the vicinity of Calcutta amongst grass in shady places, where the soil is stiff. The flowers appear about the beginning of June, and the leaves a month or two afterwards.

*Root* single, biennial, round, solid clear tubers or bulbs, the size of a filbert, with here and there a short, woolly, thick fibre projecting a little from their surface. *Leaves* radical, solitary, appearing after the plant has done flowering, short-petioled, cordate, entire, smooth, from five to seven-nerved, purple underneath, about two inches long, and in breadth nearly the same. *Scape* filiform, smooth, from three to six inches long, one-flowered, partially invested in a few remote smooth sheaths. *Bractes* a single small ensiform one at the base of the germ. *Petals* five, equal, sub-unilateral, ensiform, expanding, pale green, like the scape and sheaths. *Lip* horizontal; base enlarged by a short falcate lobe on each side, which are incurved into a tube round the column; *lamina* rhombiform, entire, expanding, rather longer than the petals, smooth except at the base in the inside, where there are a few hairs; colour very pale pink mottled with bright red. *Germ* oblong, six-ribbed. *Column* (style) as long as the

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falcate wing of the lip. *Lid, pollen* and *stigma* as in the genus.

2. E. *carinata. Roxb.*

*Root*, a single simple, sub-globular, white bulb. *Leaf* radical, solitary, cordate, smooth, seven-nerved. *Scape* many-flowered. *Lip* rhombiform, sub-trilobate; *middle lobe* half the length of the whole, and crenate. *Capsules* oval, six-winged.

A native of Bengal; in the Botanic garden it is indigenous amongst grass, and flowers in April, the dryest and hottest month of the year, at which period the plants are destitute of leaves, but they appear in May when the flowers have withered.

*Root*, a single, white, sub-pellucid tuber, exactly like that of the former, *(A. juliana)* but larger. *Leaves* radical, a single one springing from each bulb, about a month after the flowers have decayed, they are petioled, cordate, smooth, entire, of an uniform green on both sides, about seven-nerved; length and breadth rather above two inches. *Scape* erect, invested in a few simple sheaths; about six or eight inches high, and void of pubescence. *Flowers* several, peduncled, scattered round the upper part of the scape, large, drooping. *Bractes* ensiform, one under the insertion of each peduncle, and fully as long as it and the germ together, smooth. *Petals* five, equal, unilateral, linear-lanceolar, expanding, very acute, of a uniform pale green, withering. *Lip* rhombiform, at the middle on each side a deeper sinus, making the whole appear somewhat three-lobed, before these the margins are deeply and irregularly crenate, on the *inside* concave, and somewhat woolly, with purple veins, and spots on a pale greenish yellow ground. *Column* as in the genus. *Germ* oval.

3. E. *plicata. Roxb.*

*Bulb* spherical. *Scape* from two to three-flowered. *Leaves*

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single, radical, round-cordate, plaited and coloured, many-nerved.

A small, beautiful, herbaceous plant, growing under the thick shade of bamboos, in the vicinity of Calcutta, blossoming in the months of May, and June; immediately after the flowers decay the leaf from each bulb appears.

*Root*, a small, solid, probably biennial, pale white, sub-diaphanous, round bulb, marked with two sets of rings, and numerous, short, obtuse papillæ, from the centre of one of the sets of the rings issues the scape, and soon afterwards the leaf. *Leaves* radical, generally single, rust-coloured on the surface, greener underneath, round-cordate, ribbed with many nerves, both sides clothed with short, distinct, white bristles, about four inches each way. *Petioles* channelled, and enveloped in sheaths like those of the scape. *Scape* radical, appearing before the leaf, erect, generally bearing on its apex two large flowers, embraced by two or three vaginated scales. *Flowers* large; *corol* of a yellowish green, with a pale rose-coloured nectary. *Calyx; spathe* a small lanceolate bracte at the insertion of each flower only. *Petals* five, equal, lanceolate, smooth, three sub-erect, and two below. *Lip* sub-cylindric, the margins towards the base, where broadest, being incurved into a tube, which conceals the column of fructification; *lamina* two-lobed. *Column* of fructification clavate, cover cordate. *Stigma* a large clammy pit in the under side, near the apex of the column.

Is propagated by suckers from the apex of the petiole, just below the leaf, and under the surface of the soil, generally two from each, and by the close of the rains, the single bulb each terminates in, is nearly as large as the parent.

4. E. *trinervia. R.*

*Root* creeping. *Leaves* sub-radical, petioled, ovate-oblong, three-nerved. *Scape* with about three remote sheaths below the spike. *Lamina* transversely linear.

A native of the Moluccas.

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The lip and apex of the column of the fructification, are both very remarkable in this pretty plant, which is from six to twelve inches high. The latter may be compared to the bill of a sparrow, which opens when the plant is in vigorous blossom, exposing the two pedicelled polliniferous masses, hanging in a recurved direction from the apex of the upper part of the bell. The lower part, or close of the lip, linear and partly attached to the fore part of the column; the lamina linear also, but transverse, like the letter T. It has the beaked anther of Swartz's *Neottia*, and may belong to that genus.

5. E. *graminifolia. R.*

*Leaves* radical, linear-lanceolar, ribbed. *Scape* few-flowered. *Lip* three-lobed, with a double crest in the middle.

A small species, from about eight to nine inches in height; a native of Silhet, where it flowers during the rains. The flowers are pretty large and yellow.

*MALAXIS. Swartz.*

*Corol* five-petalled. *Lip* concave, patula ascending. *Anthers* operculate.

1. M. *plicata. R.*

Parasitic. *Leaves* in radical tufts, broad lanceolate, plaited. *Spikes* central, erect, naked. *Flowers* numerous.

It has the erect habit of *Katou-ponnam-maravara. Rheed. H. Mal.* xii. *t.* 28. which is quoted by Willdenow for his *Malaxis odorata.*

A native of Sumatra, from thence brought by Mr. Roxburgh to the Botanic garden in 1804, where it blossoms in July.

*Leaves* from four to five in a tuft, with their short sheathing petioles, formed into a short stalk; broad lanceolate, somewhat obliquely recurved, plaited, smooth; *margins* a

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little waved; about six inches long. *Spikes* from the centre of the leaves, and about their length, naked, striated, the upper half crowded with numerous, very small, greenish yellow, sessile, drooping flowers. *Bractes* solitary, one-flowered, recurved, linear-lanceolate. *Corol; petals* five, somewhat ferruginous; the upper two obliquely ovate, incumbent over the nectary, lower three sub-cuneate, and longer than the other two. *Labellum* greenish, inserted on the base of the column on the upper side, shorter than petals, ovate-cordate; *apex* enlarged with an obtuse point, concave and incumbent over the column, like the roof of a house. *Column* of the fructification short, sub-cylindric. *Anthers* minute, a pair being in each lobe of the lid, or cover. *Stigma* a clammy chink just below the anthers, on the upper side of the column, the situation of the nectary, and column being inverted, or resupinate.

### *CYMBIDIUM. Swartz.*

*Corol* five-petalled, erect or spreading. *Lip* with concave base, and no horn; *lamina* spreading. *Anther* a deciduous lid. *Pollen* globular.

1. C. *amabile. R.*

Parasitic, stemless. *Leaves* radical, few, lanceolate. *Scape* naked, few-flowered, perennial, by age becoming ramous. *Lateral petals* sub-orbicular; *middle lobe* of the nectary sagittate, with two twisted recurved filaments from its apex.

*Epidendrum amabile. Willd.*

Angræcum album magus. *Rumph. Amb.* vi. *t.* 43.

A native of the Moluccas, and from thence introduced into the Company's Botanic garden in 1798, where it blossoms in March and April.

The flowers of this charming species are very large, pure white, and fragrant.

The nectary is here distinctly pedicelled, besides it is rendered remarkable by the two large lateral lobes like distinct



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petals; and by the sagittate middle lobe being ornamented with two long tendril-like filaments from its apex.

2. C. *aloifolium. Willd.* iv. 401.

Parasitic, stemless. *Leaves* radical, linear, channelled, obliquely retuse. *Scapes* radical, nearly as long as the leaves, many-flowered. *Petals* lanceolate; *lamina* three-lobed.

Found by Mr. M. R. Smith growing on various sorts of trees on the Garrow hills, in full blossom in April.

3. C. *pendulum. Willd.* iv. 101.

Parasitic, stemless. *Leaves* radical, linear, distichous; retuse. *Racemes* radical, pendulous, longer than the leaves, many-flowered.

Epidendrum *pendulum. Corom. pl.* x. *N.* 44.

A native of the forests which cover the Circar mountains as well as of Bengal. Flowering time the hot season.

*Root* of many fleshy fibres, which adhere to the bark of the parent tree, stemless. *Leaves* radical, from three to five, alternate, bifarious, &c. as in the two former species, only here they are from one and a half to three feet long, and about an inch and a half broad. *Scape* radical, about two feet long, the lowermost three or four inches is involved in chaffy sheaths, the rest is the raceme, or flower-bearing part, which is perfectly pendulous, and many-flowered. *Bractes* minute, one-flowered. *Petals* lanceolate, spreading, equal, striated with red and yellow. *Lip* three-parted.

4. C. *iridifolium. R.*

Parasitic, stemless. *Leaves* bifarious, ensiform. *Spikes* filiform, drooping. *Flowers* sub-verticelled. *Lip* round-reniform, laciniate.

A very elegant species, found growing on trees in the forests of Silhet; it flowers during the cold season. Here the spikes are solitary from the bosom of the exterior leaf, supported in a pretty long, two-edged peduncle. The flower-

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bearing part drooping and crowded in a somewhat verticelled form, with innumerable, very minute, beautiful yellow flowers; the five petals oval, and nearly equal; the lip two-lobed, roundish-reniform, with the whole of the margin deeply jagged, and the inside tomentose.

5. C. *alatum. R.*

Parasitic. *Stems* bulbiform, aggregate. *Leaf* solitary from the apex of each bulb, lanceolar. *Scapes* from the base of the bulbs, drooping, many-flowered. *Column* much incurved; *apex* winged; *lamina* two-lobed.

A middling sized species, a native of the forests of Chittagong. Flowers small, tinged with ferruginous red, and not very conspicuous, they appear in April, and May.

6. C. *nitidum. Roxb.*

Parasitic. *Stems* bulbiform, shining, with two-petioled, lanceolar, lucid leaves from the apex of each. *Raceme* axillary, the length of the leaves. *Petals* lanceolar; *lamina* three-lobed, deflected.

A native of the Garrow hills, where it is found growing on trees, and like the greatest part of this order, blossoms during the hottest time of the year, viz. May.

*Root* of many, hard, pack-thread-like fibres, by which it adheres to the parent trees. *Stems* none, or rather bulbiform, long ovate, shining, nearly as large as a pullet's egg, biennial. *Leaves* two, from the apex of each bulb, petioled, lanceolar, shining, about nine inches long, by one and a half broad. *Racemes* one from the apex of each bulb between the two leaves, and about their length, smooth, the upper flower-bearing, half drooping, withering. *Flowers* a few, large, nearly white. *Petals* five, nearly equal, spreading, lanceolate. *Lip* large; *lamina* deflected, three-lobed, lower lobes large, rising up, and embracing the exterior lobes, which are ovate and rather small. *Column* elongated, clavate, recurved, apex cucullate over the four ovate, deep yellow pollen masses.



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7. C. *imbricatum. Roxb.*

Parasitic. *Stems* bulbiform. *Leaves* lanceolar, nerved, one from the apex of each bulb. *Spikes* solitary, from the bosom of the leaf, long-peduncled, drooping, bifariously imbricated, with one-flowered bractes.

Wellia Theka-maravara. *Rheed. Mal.* xii. *t.* 24.

A native of the forests of Chittagong and Silhet; where it is found on trees, in flower during the rains.

*Root* of many, slender, fleshy fibres, which fix to the bark of the parent trees. *Stems* no other than a number of oblong, fleshy bulbs, annually producing new ones from their base, which are at first sub-cylindric, and invested in two or three short sheaths. *Leaves* lanceolar, three-nerved and somewhat plaited, smooth, of a glossy green, one, never more, from the apex of each young bulb, deciduous about the end of the first year, leaving the new full grown bulb, which perishes in the course of the second and third year, from six to eight inches long, by about two broad. *Spikes* a single, long, slender, pedicelled, cylindric one rising from the bosom or axill of each leaf, compactly imbricated on opposite sides, with numerous, oblong, smooth, one-flowered bractes, when a little advanced in size drooping. *Corol*, three exterior petals nearly equal; the interior one linear-falcate, and with the exterior upper one forming a vault over the column. *Lip* with large erect sides embracing the column, and broad, three-lobed apex pointing back to the rachis. *Column* short, with a broad, thin, concave margin. *Anthers* terminal, of a deep orange colour, two-celled. *Pollen masses* two pair, oval, waxy, of a pale yellow. *Capsules* oblong, six-ribbed, smooth, rather less than an inch long.

8. C. *bambusifolium. R.*

Terrestrial, caulescent. *Leaves* bifarious, linear-lanceolate, much attenated, fine-pointed. *Panicle*, or *raceme* terminal; the exterior three petals linear-lanceolate; the inner two oblong-ventricose. *Lip* length of the petals, three-lobed; the middle lobe more or less cloven.

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Found indigenous in the forests of Chittagong, growing in well shaded places on the face of moist rocks, &c. Flowering time the hot season, March and April chiefly.

*Stems* erect, shrubby, when in flower three, four or even five feet high. *Leaves* bifarious, sheathing, linear-lanceolate, smooth, tapering from the base, and very acute, faintly from four to eight-nerved, besides the larger middle one; from six to nine inches long, and under one in breadth. *Inflorescence* terminal, sometimes a single, simple raceme, but in larger robust plants, a large panicle, composed of many, erect, spreading, simple, or compound ramifications or racemes. *Bractes* sheathing, one-flowered. *Flowers* numerous, large, rosy, with the lip of a lively red purple and very beautiful. *Petals*, the *exterior* three, linear-lanceolate; the *inner* two, oblong-ventricose. *Lip* three-lobed, with the sides or lateral lobes incurved into a tube round the column; *middle lobe* sub-rotund, and more or less cloven; *margins* elegantly curled. *Capsules* linear-oblong, six-ribbed.

9. C. *triste. Willd.* iv. 99.

Parasitic, caulescent, creeping. *Leaves* cylindric, filiform, rigid. *Flowers* forming little, short-peduncled, lateral corymbiform heads. *Lip* fleshy, with reniform cordate lamina.

Epidendrum *triste. Forst. prod. N.* 314.

A very delicate, rather small species, found on trees in the forests which cover great part of the Delta of the Ganges. In flower during the hot season.

*Roots* long, crooked, and rather fleshy. *Stems* ramous, creeping, slender as a quill, decaying at the base as they shoot from the apex. *Leaves* alternate, bifarious, sheathing, cylindric, long, slender, rigid, solid, variously curved, smooth, without any appearance of groove, or angle, as thick as a pack-thread, and about six inches long. *Peduncles* solitary, bursting the sheaths of the leaves, very short, few-flowered. *Flowers* small, in a little hemispheric, or corymbiform head. *Petals* linear, rather shorter than the lip, smooth, of a pale

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greenish yellow, the three upper ones forming a vault over the column; the lower two projecting into the margins of the lip, which is composed of an inner, oval, concave portion, joined to the lamina, or exterior reniform, cordate part; the whole is of a firm, fleshy texture, and longer than the petals; colour a dark purple, with a few yellow spots. *Anthers* deciduous; *pollen* in two round yellow waxy balls.

10. C. *aphyllum. Swartz.* See *Willd.* iv. 100.

*Root* fibrous. *Stems* simple, round, jointed, leafless. *Flowers* lateral, sub-sessile; *lip* with a convolute base, and sub-orbicular, undivided, fringed lamina.

*Limodorum aphyllum. Corom. pl.* i. *N.* 41.

A rare plant, a native of dry rocky hills. I brought it into my garden, planted it in as dry and barren a spot as I could find, but with me it lived only till the first rains fell; however, it blossomed at the beginning of the hot season.

*Roots* fibrous; adhering in a tuft to rocks, &c. *Stems* perennial, several, simple, diffuse, or pendulous, as the situation admits, naked, round, jointed at every inch, at each joint a small membranaceous scale, without the least vestige of a leaf. *Flowers* sessile, unless the germ is called a peduncle, generally single, issuing from the joints of the stems. *Lip* or *nectary* large, near the base the sides are incurved to form as it were, a tube; the exterior part six-parted; *margins* curled, waved, and ciliate; of a pale sulphur colour.

11. C. *tessallatum. Willd.* iv. 102.

Parasitic, caulescent. *Leaves* bifarious, equitant, linear, præmorse, dentate. *Racemes* axillary, few-flowered. *Flowers* bifarious. *Lip* with the sides incurved into a tube; *lamina* tapering, entire, acute.

Epidendrum *tessellatum. Corom. pl.* i. *N.* 42.

A very beautiful, perennial parasitic, found adhering to the trunks and branches of trees, amongst the Circar mountains. It flowers during the wet season.

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*Root*, several simple, or ramous, thick, smooth, long, contorted fibres issuing from the lower naked part of the stem, as well as where clothed with the lower leaves, and adhering firmly to the bark of the tree. *Stem* perennial, simple, one or two feet long, as thick as the little finger, crooked; the *upper part* covered with leaves; the *lower* naked, withering away at the lower extremity as it extends from the apex. *Leaves* approximated, imbricate, alternate, bifarious, linear, channelled, fleshy, smooth, very firm, extremities from two to three-toothed, from six to nine inches long, and about one broad. *Racemes* axillary, solitary, naked, the length of the leaves, flower-bearing part winding, few-flowered. *Flowers* from five to ten, remote, bifarious, large, beautifully waved and striated with various shades of a greenish yellow. *Petals* oval, spreading, equal, scolloped. *Lip* the length of the petals, about the middle its sides approach, forming a tube, apex somewhat pointed.

*Note.* When in flower, this is a very beautiful plant; suspended in a room or elsewhere, it will continue to grow for several months, though I believe it will not flower. In this manner it, or the following species, has been brought from China to the coast, under the name of the *air*, or *Cameleon plant*, and represented as one of the most wonderful productions of nature, because it will only thrive when so suspended.

It differs from *E. Flos acris*, in having the stem simple, and the petals oval and scolloped.

12. C. *tessaloides. R.*

Parasitic, caulescent. *Leaves* bifarious, equitant, linear, præmorse. *Racemes* lateral, longer than the leaves. *Petals* equal. *Lip* with a winged claw and fleshy lamina, which are convex and channelled above, and concave underneath; *apex* of two obtuse lobes. *Horn* conic.

Vanda. *Asiat. Res.* iv. 302.

This beautiful plant is very common in most parts of Ben-

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gal, and found on various trees, though chiefly on the mangoe. Flowering time the rainy season.

*Stem* creeping, sending forth long, thick, round, ramous, fleshy, whitish roots, which fasten firmly to the trunk or branches of the tree they grow on. The plants are seldom more than two or three feet in length, for they decay at the base, as fast as they shoot from the top. *Leaves* sheathing, bifarious, approximate, recurved, linear, keeled, præmorse, five or six inches long. *Scape* generally axillary, solitary, naked, supporting from six to twelve large beautiful flowers. *Petals* five, nearly equal, expanding, oblong; *margins* waved, and here and there a little inflected; upper surface as in *E. tessallatum*, checkered with yellow and dusky ferruginous purple, underneath white. *Lip* shorter than the petals. *Horn* conical, protruding towards the germ, between the two lower petals; *lamina* oblong, turgid; *apex* two-lobed; *sides* reflexed, so as to be convex above, and deeply concave underneath; in *tessallatum* incurved into a tube, and the apex acute; *colour* bluish purple or violet towards the apex; the *upper lip* or portion which forms the attachment of the lip and horn to the base of the column of the fructification, has two lateral lobes, obliquely broad-lanceolate, with their acute points incurved towards the apex of the column. *Column* of the fructification thick, short and obtuse, open in the interior margin near the apex. This mouth, or opening tapers down through the column, into a point, which ends in the belly of the germ; *operculum* sub-orbicular, with two pits for the two round polliniferous balls; when the lid of which is removed gently, the two anthers rise with a jerk in their broad cordate filaments; the lid inserted on the interior parts of the top of the column by a large infundibuliform base. If removed with less care, and before the anthers are ripe, they remain in their cells, and the funnel-shaped base of the filament rises erect. *Stigma* or *channel* for conveying the subtile male essence to the germ a clammy opening in the fore part of the column near its top. *Peri-*

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*carpium* clavate, with six sharp ridges running the whole length.

13. C. *præmorsum. Willd.* iv. 103.

Parasitic, caulescent. *Leaves* bifarious, imbricated, linear, præmorse. *Spikes* lateral, much shorter than the leaves, many-flowered. *Petals* equal, cuneate-oblong; *lip* with erect, ovate, glandular, crisped lamina. *Capsules* cylindric.

Thalia Maravara. *Rheed. Mal.* xii. *t.* 4.

Epidendrum præmorsum. *Corom. pl.* i. *N.* 43.

Found growing on trees in the forests which cover the Circar mountains, where it blossoms during the hot season chiefly.

*Root* and *stem* as in the former species. *Leaves* remote, alternate, bifarious, linear, channelled, smooth, very firm, emarginate, articulated just above their sheath-like base; about six inches long, and one broad. *Spikes* between or leaf-opposed, solitary, short, straight, thick, many-flowered. *Bractes* small, triangular, one-flowered. *Flowers* surrounding every part of the spike, small, variegated with red and yellow.

## *LIMODORUM. Swartz.*

*Corol* five-petalled, spreading; *lip* with base protruded into a horn; *lamina* spreading. *Anthers* terminal.

1. L. *plicatum. Roxb.*

Caulescent. *Leaves* broad, ventricose-lanceolate, cuspidate, plaited, and nerved. *Racemes* lateral, erect, simple, many-flowered. *Petals* sub-ensiform. *Lip* with a short horn, and obovate, cuspidate lamina.

Angræcum terestre primum. *Rumph. Amb.* vi. 112. *t.* 52. *f.* 1.

A native of Sumatra. Flowering time July and August. *Stems* erect, simple, short, round, jointed. *Leaves* alternate,



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petioled, broad-ventricose-lanceolate, cuspidate, plaited, and with as many strongly marked waves in the under side, as there are plaits. *Petioles* sheathing, and marked with a continuation of the nerves of the leaves down to their insertion, withering into bristly, annular stipules. *Scape* solitary from the joints of the stems below the leaves, and about their length, erect, simple, round, smooth, embraced by two or three remote, short sheaths. *Flowers* several, pretty large, of a mixture of yellow, green, and purple. *Bractes* solitary, one-flowered, ovate-lanceolate. *Petals* five, sub-ensiform, spreading; the inner two rather narrower: greenish on the outside; yellow on the inside and dotted with much purple toward the base. *Lip* obovate, cuspidate. *Horn* short and conical. *Column* of fructification as in the genus.

2. L. *bracteatum. R.*

Terrestrial, caulescent. *Leaves* bifarious, linear-lanceolate, three-nerved, raceme terminal, few-flowered. *Bractes* broad-lanceolate, large and coloured.

Found indigenous in the Garrow hills, growing in the common soil with many simple, undivided, succulent, glaucous stems, of two or three feet in height, completely invested in the sheaths of the long, narrow leaves, which are three-nerved and glaucous underneath; each stem terminating in a short, erect raceme; of three or four large white flowers, each embraced by its very large, pure white, thin, smooth bracte.

3. L. *Tankervillia. Willd.* iv. 122.

Herbaceous. *Leaves* radical, lanceolar, many nerved, and plaited. *Scape* simple, erect, many-flowered. *Lip* short-horned; *lamina* with the lateral lobes rolled in; the middle one emarginate.

A native of the hilly countries immediately north of Silhet, where it grows to be six feet high, and blossoms in April, at which period this magnificent plant is particularly beautiful.

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4. L. *virens. Willd.* iv. 123. *Corom. pl.* i. *N.* 38.

*Bulbs* undivided, conical. *Lip* of the nectary with a short horn and two lateral inflected lobes. *Leaves* radical, linear. *Scape* branchy. *Petals* lanceolate.

Katou theka Marabara. *Rheed. Mal.* xii. *t.* 25.

*Beng.* Budbari.

*Hind.* Goruma.

A native of dry, uncultivated or pasture ground, both on the coast of Coromandel, and in Bengal; flowering in the cold season.

*Root, bulbs* conical, surrounded with the circular marks of the insertions of the old leaves, greenish, apices generally above the ground, many fleshy fibres issuing from the base. *Leaves* radical, several, linear, slightly nerved; nearly the length of the scape, about an inch broad, smooth. *Scape* erect, frequently branchy, from one to two feet high, round, smooth, coloured with purple spots; here and there a sheathing, acute scale. *Flowers* remote, striated, of a greenish yellow. *Bractes* acute, short, one-flowered. *Petioles* nearly equal, erect or ascending. *Lip* broader, but shorter than the petals, laterally lobed; *lobes* involute; *middle division* or *lamina* large, cordate, and fringed.

5. L. *ramentaceum. Roxb.*

Terrestrial, herbaceous. *Leaves* radical, linear, three-nerved, and plaited. *Scape* simple, few-flowered. *Petals* linear, unilateral. *Lip* with a short horn and sub-trilobed, ramentaceous lamina.

A native of the northern parts of Bengal; in the Botanic garden, it blossoms in March, when destitute of leaves. Soon after the flower decays the foliage appears, and continues until November.

*Root*, a cluster of regular shaped, white, solid, biennial tubers. *Leaves* radical, rising in pairs within some common sheaths from the top of the recent tubers, linear, acute, three-nerved, plaited, smooth; from twelve to eighteen inches long,



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and about half or three quarters of an inch broad. *Scapes* from the former year's tubes, from six to twelve inches high, round, smooth, embraced by a few ensiform scales, the upper half supporting from six to twelve pretty large, drooping, alternate, greenish pink flowers. *Pedicels* larger than the germ, slender, recurved. *Bractes* like the scales of the lower part of the scape, but small. *Petals* five, equal, linear, spreading. *Lip* united to the base of the column, three-lobed, lower half with sides or lateral lobes incurved round the column, and protruded into short conic horns behind. *Lamina*, or middle lobe spreading, sub-obcordate, margins curled and of a deeper rose colour; down the centre pale, and marked with three ramentaceous ribs. *Filaments* simple, from the interior margin of the apex of the style, just over the stigma thin; *apex* bifid. *Anthers* two, one on each division of the filament, sub-semiglobular, yellow, and of a soft, granulated, waxy consistence. *Lid* or *helmet* vertical, ovate, deciduous. *Germ* club-shaped, three-cornered, ribbed. *Style* or *column*, semicylindric, of the length of the lip. *Stigma* large, clammy; *pit* in the inner or flat side under the apex.

6. L. *longifolium. R.*

Terrestrial. *Leaves* from a fusiform bulb, linear, channelled, three-nerved. *Scape* erect, simple, few-flowered; *petals* equal, lanceolate. *Lip* calcarate; *lamina* three-lobed. *Kas.* Tellungshor.

A native of the valleys amongst the Kasai hills; the fissures of the root spring from a slender fusiform bulb, the leaves in number about five or six, from two to three feet long, about half an inch broad, smooth and channelled; scapes radical, about one third or one fourth the length of the leaves and base, only four or five large, rosy flowers.

It differs from Thuberg's figures of *ensifolium* in the greater length and narrowness of the leaves, and three-lobed lamina of the lip. Like most of the *Orchideas*, it blossoms during the cold season.

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7. L. *bicolor. R.*

Terrestrial; *bulbs* round. *Leaves* radical, lanceolar, ribbed, plaited. *Scape* simple, erect, many-flowered, the three exterior petals, lanceolar, and green; the inner two oblong. Incumbent over the lip and column. *Lip* with a short horn, and three-lobed lamina, the middle one linear, oblong, pointed, with shaggy disk.

A native of the interior parts of Bengal. In the Botanic garden it flowers in June. The whole height is then about eighteen inches, the raceme and leaves are nearly equal, the flowers are rather remote, large, and fragrant, with the three exterior petals very long, expanding and quite green, the inner two and the lip pure white.

8. L. *recurvum. Willd.* iv. 124. *Corom. pl.* 1. *N.* 39.

*Bulbs* undivided, round. *Lip* with a short horn, and shovel-shaped, entire, crenulate lamina. *Leaves* radical, broad-lanceolate, five-nerved. *Scapes* half the length of the leaves, retrofracted. *Spike* sub-globular.

A native of the moist valleys among the Circar hills. Flowering time the beginning of the rains.

*Root*; *bulbs* undivided, biennial, striated, nearly round, surrounded with one or two rings, with many thick, fleshy fibres from their lower parts. *Stem*, if it can be so called, from the side or the base of the bulb; but it is no other than the sheath of the three or four leaves united and enveloped in two or three abrupt sheaths, scarcely appearing above the ground. *Leaves* broad-lanceolate, five-nerved, plaited, slender, a little waved round the margins, smooth, from six to twelve inches long, and three or four broad. *Scape* about six inches long, or rather less than half the length of the leaves, with a few sheaths surrounding it here and there. *Spike* globular; the *apex* looks straight to the ground, many-flowered. *Bractes* sessile, straight, lanceolate, one-flowered. *Flowers* numerous, crowded, middle sized, white, with a small tinge of yellow. *Petals* nearly equal; *lip*

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broad; *apex* rounded, undivided, shovel-formed, crenulate. *Horn* scarcely any.

*Note.* The plant when in flower, looks well. I have raised them in my garden for some seasons, where the leaves remain most part of the year.

9. L. *nutans. Corom. pl.* 1. *N.* 40.

*Bulbs* undivided, roundish, smooth; *lip* ovate-cordate, acute. *Scape* longer than the oblong, five-nerved leaves. *Raceme* nodding.

Bela pola. *Rheed. Mal.* xi. *t.* 35.

Malaxis *nutans. Willd.* iv. 93.

It is a native of the same places with the last. Flowering time the same.

It differs only from the former in the following respects. Here the bulbs are smooth, there striated. Here the leaves are oval, there lanceolate. Here the scape is longer than the leaves, there not half so long. Here the spike is oblong, and pendulous, there globular and retrofracted. Here the flowers stand at some distance from one another, there they are crowded. Here they are of a beautiful rose colour, there white. Here the lip is sharp pointed, there circular and crenulate.

10. L. *candidum. R.*

Herbaceous. *Leaves* two, sub-radical, lanceolar, finely nerved and plaited. *Scape* erect, much shorter than the leaves; *raceme* drooping. *Lip* oval, with scarcely any horn.

Mearmee the vernacular name near Silhet, where it is indigenous; and flowers during the hot season. Is nearly allied to L. *recurvum.*

*Root* tuberous, with very thick, soft, white, spongy fibres. *Stem* short, composed of the tubular petioles of the two leaves, embraced by two or three tubular sheaths. *Leaves* two, lanceolar, about five-nerved and plaited, pointed, smooth on both sides; from six to twelve inches long, besides the peti-

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oles, which are about six inches more, from three to four inches broad. *Scape* as long as the petioles of the leaves, and embraced by a few flower-bearing sheaths; *apex* short and drooping as in L. *recurvum*. *Flowers* of a middling size, white. *Bractes* ensiform. *Petals* five, oblong, spreading, the exterior three rather narrower, of which the lower two are considerably falcate. *Lip* much larger than the petals, oval, emarginate; *centre* tinged with pink, with a swelling behind, but no horn. *Column* short. *Pollen masses* two, sub-orbicular. *Lid* deciduous.

### *AERIDES. Swartz.*

*Corol* five-petalled, spreading. *Lip* calcarate; *lamina* saccate. *Anther* a deciduous lid.

1. A. *guttatum. Roxb.*

Parasitic. *Stem* creeping. *Leaves* bifarious, imbricated, linear, channelled, obliquely præmorse. *Racemes* axillary, pendulous. *Flowers* pedicelled. *Lamina* entire, ascending, oblong; *sac* wide, and obtuse; *capsule* triangular.

*Beng.* Perida Mura.

This lovely parasitical species was found growing on trees in the vicinity of Dacca by the Honourable Charles Andrew Bruce, who sent plants to the Botanic garden at Calcutta. Flowering time the hot and rainy seasons, it has a great resemblance to the tables in Rheed's *Hortus Malabaricus*, quoted by Willdenow, for *Aerides retusum* and *præmorsum*, but the capsule differs from both and I believe the horn and lip of the nectary also; however they are certainly very nearly allied, and not inferior in beauty, while in flower, to any of the whole order of *Orchidea*.

*Root* of several, thick, fleshy, obtuse fibres, which issue from the stem, through the sheaths of the lower leaves, and adhere to the tree which gives support to the plant. *Stem* perennial, creeping, invested in the sheaths of the leaves. *Leaves*

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bifarious, imbricated, sheathing, incurvate, linear, channelled, thick, firm, and smooth; *apex* obliquely præmorse, from six to twelve inches long, by one broad, when laid flat. *Racemes* axillary, solitary, drooping, longer than the leaves. *Flowers* numerous, pedicelled, approximate, diverging, pretty large, colour a beautiful mixture of red and white, spotted. *Bractes* ovate-cordate, one-flowered, embracing the insertion of the pedicel. *Corol,* or *calyx* of Swartz, five-petalled, the upper three oblong, the middle or inferior one of these broader, the lower two semi-cordate. *Nectary, (labellum,* Swartz,*)* longer than the petals, and more deeply coloured, ascending, concave, cuneiform, with the apex slightly three-lobed, behind protruded into a large, open, obtuse bag, or horn. *Column* of fructification short. *Anthers* or polliniferous balls two, covered with a deciduous lid. *Germ* inferior, three-sided. *Stigma* an oblong clammy opening in the middle of the inferior, flat side of the column. *Capsule* pedicelled, oblong, three-sided; *angles* sharp, sides with a broad, flat keel, one-celled, three-valved.

2. A. *cornutum.*

Parasitic, ramose. *Leaves* bifarious, linear, retuse. *Racemes* axillary, drooping. *Lip* with three-cleft lamina and hooked horn, rising forward and upwards.

Found growing in trees in the vicinity of Dacca, and the eastern frontier of Bengal, in flower in April, and sweetly fragrant.

*Root* of several, long, thick, fleshy cords, by which they bind themselves firmly to the trees they grow on. *Stems* perennial, often divided, decaying at the base, as they shoot from the apex, invested in the sheaths of the leaves. *Leaves* equitant, bifarious, sheathing, linear, smooth, channelled, drooping, obliquely præmose or retuse; from six to nine inches long, by from one to one and a half broad. *Racemes* sub-axillary, solitary, drooping, longer than the leaves. *Flowers* large, surrounding more than the exterior half of the

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stalks, diverging, white, with a tinge of pink, sweet-smelling. *Bractes* sub-reniform, one-flowered. *Petals* five, expanding, the upper one oval; the next two rather narrower, but of the same length; the lower two sub-orbicular and much larger than the other three. *Nectary* or *lip* very large; its lamina deeply three-parted, but closed like a case for the column of fructification; *lateral lobes* obliquely wedge-shaped, and truncate; the *middle* one sub-lanceolate with an incurved apex. *Horn* incurved into a very perfect hook; *apex* green and somewhat obtuse. *Column* of fructification very short, but protruded downward into a long concave receptacle for the lower two petals and nectary. *Lid* beaked. *Filament* single, rising with a bifid apex, from a beaked process, on the interior part of the top of the column. *Anthers* two, globular, deep yellow. *Stigma* immediately under the beak. *Germ* linear, twisted a little.

*Note.* My *Limodorum obtusicornu* no doubt belongs to the same genus with this. They are both most beautiful while in flower; in appearance *obtusicornu* has rather the advantage, but the sweet fragrance of the flower of this lovely modest looking species must give it a decided preference.

3. A. *suaveolens. Roxb.*

Parasitic, caulescent. *Leaves* bifarious, linear, bidentate. *Racemes* lateral, filiform, drooping. *Lamina* horn-shaped, unguiculate, with two oblong erect lobes at the base.

Found on trees in the forests of Chittagong, where it perfumes the air with the delightful fragrance of its flowers, the whole year round.

*Stems* rooting, short, slender, and simple, somewhat succulent, the whole length being only a few inches, and scarcely thicker than a crow's quill, perishing at the base as they shoot from the apex; from the most succulent parts, the fleshy roots issue, and fix to the tree that supports the plant. *Leaves* bifarious, sessile, stem-clasping, linear, fleshy, smooth on both sides; *apex* two-toothed; from three to six inches



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long, and rather more than half an inch broad. *Racemes* lateral, much longer than the leaves, drooping elegantly. *Flowers* numerous, scattered round the whole of the raceme in great profusion, small; *colour* a yellow ground, spotted with purple, delightfully fragrant. *Petals* five, spreading, nearly equal, narrow, obovate. *Lip* between the lower two petals, and longer than them, though they are the longest of the five, united to the base of the style, by a perfect, short, linear claw. *Lamina* fleshy, horn-shaped, obtuse, perforated a little way up from the base and on each side of the perforation a conical lobe projecting up and inward to the apex of the style. *Stamina, pistillum* and *capsule* as in the genus.

4. A. *rostratum. Roxb.*

Parasitic, caulescent. *Leaves* bifarious, linear, channelled; *apex* præmorse. *Racemes* lateral, longer than the leaves. *Lip* clavate, sac-conical from the apex of the lamina, column beaked, with another on the posterior part near the base.

A parasitical species; in external habit like *præmorsum, retusum*, &c. but smaller, and the leaves more remote from each other. It is a native of the forests of Silhet, where it blossoms in April and May.

*Racemes* opposite to the leaves, or solitary, ascending, the length of the leaves, many-flowered. *Petals* five, nearly equal, spreading, rose-coloured, the lower two adhering to the under side of the posterior part of the lip, as in *Dendrobium* but forming nothing like a spur, or claw. *Lip* horizontal, of the colour of the petals, and about as long as they, clavate; there is a deep channel on the upper side, which descends into the conical bag or case, which points down from the apex of the lamina, in which before expansion, the recurved part of the beak of the style is lodged. *Style* or column very short, but continued in a long, ascending, purple beak, with a recurved white apex to this apex; the two, roundish *pollen balls* are attached by a white, flat filament, which is just as long as the beak, and allows the balls to rest

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in the posterior part of the apex of the body. *Column* opposite to the stigma, covered by the usual two-lobed anther.

5. A. *pallidum. R.*

Parasitic, caulescent. *Leaves* bifarious, linear, emarginate. *Racemes* lateral. *Lip* or *sac*, slipper-shaped, with two semilunar lobes at the base, column short, beaked from interior margin over the stigma. *Capsules* cylindric.

Found growing on trees in the forests of Chittagong and the eastern parts of Bengal. It flowers in May and June. It is a small species, the flowers also small and of an uniform pale yellow colour.

*Root, stem* and *leaves* as in the other species, but rather slender. *Racemes* lateral or opposite to the leaves, solitary, diverging, with the flower-bearing part much thicker and drooping. *Flowers* numerous, small, in one variety white, in another pale yellowish with a faint tinge of pink. *Petals* five, the upper and exterior oblong and concave, the lower two obliquely oval; the inner two obliquely oblong and rather smaller than the exterior three, and all shorter than the lip, which bears a very exact resemblance to a slipper. *Column* short, with a beak projecting forward over the stigma, and base of the lip; to its apex the proper filament is attached. *Pollen masses* globular. *Capsule* cylindric, slender as a crow's quill.

6. A. *multiflorum. R.*

Parasitic, caulescent. *Leaves* bifariously imbricated, linear, channelled, obliquely emarginate, with a hooked acumen. *Racemes* axillary or lateral, longer than the leaves, sometimes compound. The *lower* two exterior petals subrotund. *Lip* with broad-cordate, entire lamina, and a short obtuse horn projecting under it. *Capsules* clavate, three-sided.

A large and beautiful species, with copious, very long, suberect racemes of numerous, pretty large, pink-coloured flow-



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ers: A native of Silhet, where it grows on trees and flowers during the hot season.

7. A. *ampullaceum. R.*

Parasitic, caulescent. *Leaves* bifariously imbricated, linear, emarginate. *Racemes* axillary, short. *Petals* oval, nearly equal; *lip* with a long, flagon-shaped bag, and linguiform lamina.

Found by Mr. M. R. Smith growing on trees in the forests, in blossom in May.

*Stems* short and generally simple, from the lower part throwing out the fleshy, strong, radical cords, by which they are bound to the parent tree; they are only a few inches long, decaying at the base, as they shoot from the apex. *Leaves* sheathing bifariously, imbricated, linear, hard and glossy, obliquely emarginate, about six inches long. *Racemes* axillary, scarcely one third the length of the leaves, erect; rachis withering and remaining. *Flowers* numerous, small, rosy. *Petals* nearly equal, oval, and spreading. *Lip* with a sac, or bag, pendulous, and twice as long as the petals; *lamina* short; linguiform. *Column* short. *Pollen masses* two and globular. *Capsules* clavate, six-ribbed.

8. A. *radiatum. R.*

Parasitic. *Stems* bulbiform, with a single lanceolar leaf from the apex of each. *Scape* umbelliferous, the lower two petals very long and falcate. *Lip* conical, recurved, cellular.

Found by Dr. W. Carey indigenous on trees in the Delta of the Ganges, where it blossoms about the beginning of the rains.

*Root* of many, hard, slender fibres. *Stems* no other than the little remote round bulbs, which are connected by a slender shoot of about an inch in length. *Leaf* a single one from the apex of each bulb, lanceolar, somewhat channelled, fleshy and smooth, from three to four inches long, and less than one broad. *Scape* from the base of the bulb, longer

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than the leaves, filiform, invested in a few, small, remote sheaths. *Flowers* about ten or twelve, a semiradiate umbel in the apex of the scape, rather small; prevailing colour yellow. *Petals* very unequal; the upper three ovate, striped with purple lines and ciliate margins, that of the apex larger, and filiform, those three are only a little longer than the column, the lower two falcate, five or six times longer than the upper three, united at the base under the lip which they completely embrace and hide, they are of an uniform yellow colour, and on account of their great size, when compared to the rest of the flower, give to the whole that colour. *Lip* united to the base of the column by an incurved claw, somewhat conical, but much recurved, internally cellular. *Column* short, interior margins winged. *Pollen masses* two, globular, covered by a two-lobed deciduous lid.

### *DENDROBIUM. Swartz.*

*Corol* five-petalled, erecto-patent; the two exterior, lateral ones, united round the base of the lip into a horn-like process. *Lip* attached to the base of the column. *Anther* a terminal, deciduous lid.

1. D. *aggregatum. Roxb.*

*Bulbs* aggregate, with a solitary, linear oblong, smooth, emarginate leaf from the apex of each. *Scapes* from the side of the bulbs, drooping, many-flowered. *Lip* reniform, emarginate.

Received into the Botanic garden, from Mr. Pierard; who found it growing on the trunk of *Lagerstroemia regina* in the northren border of Arracan, and observes that it is found in the woods always only on that tree.* It blossoms in March, but produces no fruit.

* It is also found to grow well on the mango tree in the Botanic garden.

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*Root*, from the contracted base of the bulbs issue many small, fleshy, ramous fibres, matted together, and adhering to the tree on which the plants grow. *Bulbs* aggregate; they may also be reckoned swelled stems, though I would rather call them bulbs; particularly as there is an articulation which unites the proper petiole to the apex of the bulb, and at that place the leaf drops off, leaving the permanent bulb naked; until the new leaf comes out they are smooth, oblong, tapering equally towards each end, more or less octangular, according as they are plump or lean, from two to three inches long, and marked with two or three annular rings, the cicatrices of the sheath of the petioles of the former leaves, where some of their longitudinal fibres also remain. *Leaves* a single one, rarely two from the apex of each bulb, short-petioled, oblong, entire, emarginate, veinless, and of a firm leathery texture, with a smooth shining surface, from four to six inches long, and from one to two broad. *Raceme*, or *scape*, from the side of the bulb, drooping, many-flowered. *Flowers* numerous, alternate, large, beautiful, of a bright yellow. *Bractes* solitary, small, pointed, one-flowered. *Corol*, the exterior three petals sub-triangular, united round the insertion of the flower on the germ and horn of the petals; the inner two oval, and larger. *Lip* much larger than the petals, sub-reniform, emarginate, of a deep yellow in the centre and paler round the margin. *Column* of fructification, or style short. *Stigma* a funnel-shaped opening in the fore-side of the column, which communicates with the belly of the germ. *Anthers* oblong, two-lobed, and covered with a two-lobed lid.

2. D. *tripetaloides. R.*

Parasitic. *Stems* bulbiform, with the scape from the base of the bulb, many-flowered; *exterior* three petals lanceolately conic; *inner* two minute. *Lip* linguiform.

Found on trees in the forests near Rangoon by the Rev. Mr. F. Carey, and by him sent to the Botanic garden, where it blossoms in the cool season.

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*Scape* from the base of the bulb, simple, naked, slender smooth, from three to five inches long. *Raceme*, or flower-bearing part longer than the scape, round. *Flowers* numerous, middling sized, white, scattered over every part of the raceme. *Bractes* solitary, ensiform, one-flowered. *Petals*, the *exterior* three lanceolate-conic, acute, one in each side and one above; the *inner* two linear, oblong, minute, and ciliate. *Lip* linear, obtuse, recurved, shorter than the three exterior petals, and attached by a slender isthmus, to the lower edge of the base of the exterior two, colour an uniform brownish orange. *Column* and other parts, as in the genus.

3. D. *pumilum*. *R.*

Parasitic. *Leaves* two from the apex of each of the turbinate bulbs. *Peduncles* solitary between the pair of leaves, one-flowered.

This is the smallest species I have yet met with, it grows on trees in the forests of Chittagong, where it blossoms during the rains.

Parasitic, stemless, or rather, the stems bulbiform; *leaves* from three to four, rising from each bulb, lanceolar, even, smooth and rather fleshy. *Scapes* from the base of the bulb; raceme villous, bearing many erect flowers; the inner two petals linear. *Lip* recurved, with somewhat three-lobed lamina.

Found indigenous on trees in the forests of Chittagong, from thence introduced into the Botanic garden where it blossoms in February.

*Root*, consisting of many firm, slender, tortuous fibres, which adhere to the parent tree. *Stem* no other than the ovate oblong, smooth, green, somewhat compressed, solid bulbs, which give support to the leaves; they multiply by short suckers from the base of those of the former years, and are generally from half an inch, to an inch asunder. *Leaves* about four, from and around the apex of each bulb, narrow lanceolar, smooth, and fleshy, from four to eight inches long, and one or one and a half broad. *Petioles* short, channelled,

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sheathing. *Scapes* generally solitary, from the base of the bulbs, spreading; base embraced by a few sheaths, the rest downy. *Raceme* generally simple, which with the scape is about as long as the leaves and bulb, somewhat flexuose, downy, many-flowered. *Flowers* remote, pedicelled, erect, of a middling size, yellow, inodorous. *Bractes* ensiform, one below each pedicel. *Petals*, the exterior one, sub-triangularly-lanceolate, the interior two linear-lanceolar. *Lip* recurved, with a small lobe on each side below the middle; *apex* retuse with a point in the sinus. *Pollen masses* composed of twice two pair of minute, oval, compressed, yellow grains. *Column* half the length of the two inner petals.

4. D. *cruminatum. R.*

Parasitic. *Stems* simple, swelled, and angular near the base. *Leaves* bifarious, stem-clasping, linguiform. *Flowers* suspended near the apex of the stem. *Lip* three-lobed; the *lateral lobe* incurved into a tube; *lamina* roundish, acuminate.

Angræcum nonum. *Rumph. Amb.* vi. *p.* 104. *t.* 47. *f.* 2.

A native of Amboyna, and from thence brought to the Botanic garden at Calcutta by Mr. C. Smith. Flowering time, in Bengal, the rainy season.

*Root* consisting of many, perennial, green, fleshy fibres, spreading over, and adhering firmly, to the parent tree. *Stems* several, sub-erect, swelled above the base and there octangular, from thence to the apex slender, round, tapering, gently invested in the sheaths of the leaves, or if they have fallen, marked with their annular cicatrices and a few slender bristles; the whole length from two to three feet. *Leaves* bifarious, sheathing, linguiform, entire, smooth, firm, and fleshy, veinless; from two to four inches long, and about one broad. *Flowers* sessile, except the curved slender germ be considered a peduncle, solitary from the last two, three or four leafless joints of the stem, large, pendulous, suspended on their curved, slender, filiform pedicel, faintly fragrant. *Bractes* three-fold, one-flowered, short, sheathing the base of the

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germ. *Corol* almost pure white, besprinkled with minute, pellucid dots, like the grains of fine loaf-sugar; *petals* unilateral, sub-lanceolate, the lower two longer, united to, and protruded with the column of fructification of the apex of the horn of the nectary. *Lip* occupying the under side, opposite to the petals, and like them sprinkled with the same pellucid specks; *horn* or *pouch* large, and conical; *lamina* three-lobed, on the centre a yellow line runs the whole length; *lateral lobes* incurved; *terminal* one nearly round, and pointed from the exterior portion of the margins being incurved; all, particularly the last mentioned, are beautifully marked with pink-coloured, curved, ramous veins, and the margins elegantly fringed. *Column* of the fructification nearly half the length of the lip, on the apex rest two, very perfect, yellow anthers. *Germ* filiform, recurved, not visibly twisted, the length of the horn of the nectary. *Stigma* a large opening on the fore part of the column a little below the anthers, and directly opposite to the germ, which it penetrates deeply.

5. D. *clavatum. R.*

Parasitic. *Stems* club-shaped; *bulbs* with three or four broad lanceolar leaves from the apex of each. *Racemes* lateral; *petals* nearly equal; *lip* shovel-shaped, entire.

Found growing on trees in the forests which cover the Garrow hills, where it is called *tiluscou*. Flowering time the hot season, chiefly April.

*Root* consisting of innumerable, firm, fleshy, vermicular cords, by which the plants adhere firmly to the parent tree. *Stems* numerous, bulbiform, clavate, tapering into a hard, fibrous, slender peduncle, between the bulb and root, giving to the whole the appearance of a club, hence the specific name. *Leaves* from three to four from the apex of each stem or bulb, broad-lanceolar, lucid, firm, about seven-nerved; five or six inches long, by one or two broad. *Racemes* from the side of the bulb, about as long as the leaves. *Flowers* pret-



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ty large, of a lively yellow colour. *Bractes* large, oblong, membranaceous, one-flowered. *Petals* five, nearly equal, oval, and obovate. *Lip* the length of the petals, with the side incurved toward the base; *lamina* shovel-shaped, with crisped margins, and the colour deeper than the rest of the corol. *Genitalia* as in the genus. *Capsule* clavate, six-ribbed, smooth and leaved.

6. D. *veratrifolium. R.*

Parasitic. *Leaves* lanceolar, from three to seven-nerved, several, from the apex of the long conic bulb, forming a stem with their long tubular, concentric sheaths. *Scape* many-flowered; *petals* sub-lanceolar; *lamina* with a broad, three-lobed apex; the *middle* one plaited and curved.

Hatakeveree, the vernacular name in the Garrow country, where it is indigenous; flowering in April and May.

*Root* of many, strong, fleshy fibres from the base of each bulb, by which they adhere to the parent tree. *Bulbs* long, and rather slender for the size of the plant, tapering off into a stem, formed by the long, concentric, tubular sheaths of the leaves, from two to four feet long, giving a total length of from three to five feet, leaves included, to the whole plant. *Leaves* from four to six from each bulb; sparse, sheathing, lanceolar, from three to seven-nerved and somewhat plaited, smooth, acute; from six to eighteen inches long, and from two to four broad. *Scape* from the base of the bulbs, generally solitary, about twelve inches long; the *lower* three fourths naked, invested in a few remote sheaths; the *upper portion* or *raceme*, about one fourth part of the whole, and bearing from ten to twenty large, beautiful, yellow flowers. *Petals* five, nearly equal, spreading, sub-lanceolar. *Lip* large and longer than the petals, projecting behind into a large conical horn; *apex* of the *lamina* broad, three-lobed, the middle lobe beautifully curled, and of a much brighter colour.

7. D. *Pieradi. Roxb.*

Parasitic, caulescent, pendulous. *Leaves* bifarious, lan-

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ceolate, emarginate. *Flowers* peduncled, from one to two or three from the joints of the leafless stems. *Lip* entire, tubular toward the base.

Sent with some other species, from Chittagong to this garden, by Mr. Pierard. This beautiful parasitic is a native of that place, as well as of various parts of the Delta of the Ganges, where it is generally found on mango trees.

*Root* perennial, fibrous, adhering to the parent tree. *Stems* perennial, numerous, simple, drooping, round, smooth, jointed, while young leaf-bearing, but as they advance in age the leaves drop, and they ever afterwards remain naked, except when decorated with blossoms, generally from two to five feet long. *Leaves* alternate, sessile on their sheaths, lanceolate, smooth, firm and shining on both sides; from two to four inches long, and about one broad. *Flowers* one or two, rarely three, on very short peduncles, which issue from the joints of the stems. They are large and of a pale yellow colour. *Corol;* the *exterior* three petals narrow, tapering from the base, with the margins recurved; the *inner* two broader, and oblong. *Lip* the length of the petals, shovel-shaped, with the margins slightly curled, and somewhat ciliate, towards the base incurved into a tube, which conceals the column of fructification. Its very pedicel is protruded from the base of the style, or column of fructification. *Germ* inferior, &c. as in the rest of this natural order. *Column* of fructification, or the term *style* might still be a better one, short, hid in the involute tubular portion of the lip near the base, semi-circular, with flat, furrowed lamina. *Stigma* on the interior side of the column, a little below the apex is a hollow, glutinous gland with a very perfect perforation, which ends in the cavity of the germ; this I consider to be the real *style* and *stigma*, or in other words, the organ by which the powers of the male are conveyed to the female. *Stamina; filaments* two, exceedingly short and slender, joining the posterior small end of the two, obovate, oblong anthers to the posterior part of the two-lobed concavity. *Receptacle*



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of the *anthers* on the apex of the style. *Lid* or *veil* mitre-shaped, emarginate.

8. D. *purpureum. R.*

Parasitic. *Stems* simple, pendulous, in flower leafless; *leaves* bifarious, lanceolate. *Flowers* numerous in dense ovate heads. *Lip* linear, oblong, entire.

Angræcum purpureum. *Rumph. Amb.* vi. *t.* 50. *f.* 1.

A native of the Moluccas, from thence introduced into the Botanic garden, where it blossoms in February and March.

*Root* of numerous fleshy fibres, adhering in all directions to the trunks and branches of trees, here it thrives best on the mango tree. *Stems* perennial, several, pendulous or nearly so; for the first year or two fleshy, when old naked, marked with the circular cicatrices of the fallen leaves; they are then somewhat rugose, longitudinally furrowed, and thickest toward the middle; the general length three or four feet. *Leaves* alternate, bifarious, sessile on their smooth, cylindric sheaths, spreading, lanceolate, entire, of a slender texture, and polished on both sides; from four to six inches long, and about one broad. *Bractes* cordate, acute, one-flowered. *Flowers* numerous, in dense, ovate, solitary heads, from the cicatrices of the leafless stems, small and of a lively purple. *Corol* five-petalled, &c. as in the genus, with a large obtuse horn. *Lip* sub-cylindric, with ovate, rather pointed, entire lamina.

9. D. *pendulum. R.*

Parasitic. *Stems* simple, pendulous, contracted at the joints and base, when old leafless. *Leaves* on the young shoots, bifarious, linear. *Flowers* in pairs from the joints of the old leafless stem, drooping; *petals* sub-equal, lanceolate; *lip* sub-orbicular, short-clawed. *Capsules* clavate, obscurely six-ribbed.

Found growing on trees in the forests of Chittagong, in flower during the hot season. It seems to approach the near-

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est to D. *moniliforme*, and if Kæmpfer's figure were inverted, they might be taken for the same.

10. D. *teres. Roxb.*

Parasitic. *Stem, branches* and *leaves* all columnar. *Racemes* leaf-opposed, and of their length, few-flowered. *Stamina* stem-shaped, and bifid.

Found on trees in the forests of Chittagong and Silhet, where it blossoms during the hot months of April, and May, when nothing can exceed its beauty.

*Root* of thick, fleshy, crooked, lateral cords, which embrace firmly the parent tree. *Stem* ramous, and with the branches columnar and smooth. *Leaves* remote, bifarious, columnar, smooth, from six to eight inches long, and as thick as a common quill. *Racemes* leaf-opposed, from six to twelve inches long, flexuose, round, smooth. *Bractes* ovate, one-flowered. *Flowers* generally from three to six on the raceme, but immensely large as they expand fully four inches, of a lively pink colour, with the large conic horn ferruginous. *Corol;* the *exterior* three petals oblong; the *lower* two obliquely so; the *interior* ones nearly round. *Lip*, its posterior part united with the insertion of the exterior lower two petals into a large ferruginous conic horn. *Lamina* deeply three-lobed; *lateral lobes* incurved round the column; the *middle* one fan-shaped, and bifid. *Germ, column, anther*, and *stigma* as in the genus. *Capsule* clavate, three-sided, down the middle of each side is a three-sided rib.

11. D. *formosum. R.*

Parasitic, caulescent. *Leaves* bifarious, sessile, lanceolate; *peduncles* terminal, few-flowered. *Lip* sub-panduriform, retuse.

Found on trees in the forest of Silhet and the Garrow mountains; in flower in April and May.

*Root* of fleshy, crooked, cord-like fibres, which embrace the parent tree, as in other similar parasites. *Stems* many, cy-

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lindric, a little furrowed, and while young well clothed with short black hairs, which in time are rubbed off. *Leaves* bifarious, rather remote, half stem-clasping, lanceolate, obtuse, or emarginate, smooth, firm and rather fleshy, from three to four inches long, by one or one and a half broad. *Peduncles* terminal, solitary, racemiform, from two to four-flowered. *Flowers* very large, pendulous, scarcely inferior to those of D. *teres*, expanding, three inches and a half, of a pure shining white, except the middle of the lip, which is yellow, sweetly though faintly fragrant. *Corol;* the *exterior* three petals lanceolate, acute and ribbed; the *interior* two oval, and more faintly ribbed. *Lip*, its posterior portion, beyond the insertion of the whole flower on the germ, united its whole length with the base of the two lower exterior petals into a large conic horn. *Lamina* panduriform, with a retuse apex. *Column*, &c. as in the genus, and well described by Swartz.

12. D. *pulchellum. R.*

Parasitic, caulescent. *Leaves* bifarious, sessile, lanceolate, obtuse, finely ribbed. *Raceme* lateral on the old leafless stems; *lip* with a large obtuse horn, and obcordate, ciliate, ramentaceous lamina.

Found indigenous on trees and in rocks in the forests of the Silhet hills, in flower in May and June. A very beautiful species, the flowers are considerably smaller than in D. *formosum;* but the colour more lively.

*Root* of numerous, strong, pack-thread-like fibres, which fasten on trees or rocks. *Stems* many from the same tuft of roots, simple, nearly straight, furrowed, otherwise smooth and rather lucid, marked with the circular scars of the fallen leaves, about three feet long, and thicker than a ratan, while young well decorated with leaves, when old leafless, and then floriferous. *Leaves* alternate, sessile, rather remote, narrow lanceolar, obtuse, finely ribbed; from four to five inches long, by one broad. *Racemes* lateral, from the old leafless stems or branches, diverging, flexuose, with one large pale,

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pink flower at each of the six or eight curvatures. *Bractes*, one at the insertion of each pedicel, long and tapering. *Petals* five, of the exterior three the upper one is lanceolar, the pair falcate and rather larger; the interior two oval. *Lip* with a pretty large obtuse horn, and broad, spreading, beautifully coloured, obcordate lamina, which is rather shorter than the petals.

13. D. *anceps. Willd.* iv. 136.

Parasitic, caulescent. *Leaves* distichous, equitant, fleshy, broad-ensiform. *Peduncles* from the sheaths of the leaves, one-flowered.

This interesting rather small species is found on trees in the Delta of the Ganges: in flower during the hot season.

14. D. *acinaciforme. R.*

Parasitic. *Stem* and *branches* flat, thin, slender, two-edged. *Leaves* stem-clasping, bifarious, scimitar-shaped. *Flowers* suspended from the terminal joints of the then leafless twigs. *Lip* one-lobed, crenulate.

Herba supplex. *Rumph. Amb.* vi. *p.* 110. *t.* 51. *f.* 2.

A native of Amboyna, from thence sent to the Botanic garden where it blossoms during the rains.

*Root* of numerous, firm fibres, adhering firmly to the parent tree. *Stems* and *branches* a little drooping, or straggling, jointed, and smooth, at the base round, slender, of a very firm texture; above enlarging considerably and becoming perfectly flat, indeed thin, with two sharp edges. *Leaves* on the young shoots only, alternate, bifarious, sessile on their permanent sheaths, acinaciform, or they may be called semi-lanceolate, pointed, firm, fleshy, smooth, veinless; from two to three inches long, and about half an inch broad. *Sheaths* as long as the joints, and like them compressed. *Flowers* from the joints of the leafless branches suspended on their slender pedicel-like germs, very small, every part yellow, even the centre of the nectary. *Bractes* several, minute,

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surrounding the insertion of the germ with the joint of the branchlet. *Corol* slipper-shaped, split on the under side to the apex of the large horn, the inner two petals small and adjoined as if distinct. *Lip* obovate cuneate, emarginate; interior margins crenulate, and slightly waved.

15. D. *calceolum. Roxb.*

Parasitic. *Stem* and *branches* straggling, thin, two-edged. *Leaves* bifarious, stem-clasping, fleshy, ensiform. *Flowers* suspended from the joints of the extremities of the leafless slender twigs. *Lip* three-lobed; *middle lobe* emarginate.

Herba supplex. *Rumph. Amb.* vi. *p.* 110. *f.* 3.

A native of Amboyna, from thence brought to the Botanic garden, where it blossoms during the rains.

*Root* perennial, consisting of numerous, fleshy fibres adhering to the parent tree. *Stems* and *branches* perennial, long, slender, jointed, flat, two-edged, straggling or hanging to a length of many feet, frequently striking root from the joints, for the most part invested in the permanent withered sheaths of the leaves. *Leaves* on the young shoots only, bifarious, sessile on their permanent sheaths, ensiform, firm, fleshy, veinless; from two to three inches long, and about half an inch broad. *Sheaths* as long as the joints, smooth, compressed, fleshy, withering. *Flowers* from the joints of the extreme naked twigs, pretty large, pendulous on the slender peduncle-like germs, of a dull orange colour and slightly veined with dull red. *Bractes* several, minute. *Corol* slipper-shaped. *Lip* with the apex two-lobed; the *exterior lobe* emarginate, all are slightly crenulate and curled.

## GYNANDRIA HEXANDRIA.

### *ARISTOLOCHIA. Schreb. gen. N.* 1383.

*Calyx* none. *Corol* one-petalled, with a tongue-shaped border and gibbous base. *Germ* six-celled; *cells* many-

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seeded, attachment central. *Capsule* inferior, six-celled, many-seeded.

1. A. *acuminata. Willd.* iv. 157.

Perennial, twining, smooth. *Leaves* cordate, rather acuminate. *Racemes* axillary, simple or compound, drooping.

A native of the eastern parts of Bengal, where it flowers during the hot and rainy seasons, and the seed ripens in December and January.

*Stem* and *branches* twining to an extent of some fathoms, perennial, younger shoots angular, and smooth. *Leaves* alternate, petioled, cordate, entire, somewhat acuminate, smooth; *lobes* large, and roundish, from four to six inches long, by from two to four broad. *Petals* about an inch long, slightly channelled. *Racemes* axillary, simple or compound, drooping, shorter than the leaves. *Flowers* large, drooping, of a dark-greenish purple. *Corol* with a funnel-shaped tube, globular base, and long, linear, somewhat acute lamina, the sides of which, soon after expansion, become revolute. *Stamina* as in the genus. *Germ* inferior, sub-cylindric, furrowed, six-celled, in each many ovula in one vertical row attached to the axis; *style* none; *stigma* peltate, with a converging, six-lobed apex.

2. A. *Indica. Willd.* iv. 157.

Shrubby, twining. *Leaves* cordate, cuneate, scolloped. *Peduncles* many-flowered.

*Beng.* Eeshwur-mool.

Careloe Vegon. *Rheed. Mal.* viii. *t.* 25.

*Teling.* Isaro.

A native of copses, and jungles where the soil is dry and poor. It flowers during the wet season.

*Root* much like that of *Sarsaparilla*, perennial. *Stem* twining, below woody; *young shoots* striated, smooth. *Leaves* alternate, petioled, somewhat wedge-formed or obovate, three-nerved, pointed, waved, scollopped, smooth, from two to four



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inches long and from one to two broad. *Racemes* axillary, shorter than the leaves; bracted. *Flowers* erect. *Anthers* six pair, as in A. *bracteata*. *Capsules* oblong, pendulous.

The roots, like those of *bracteata*, are nauseously bitter, and I think rather more so than they are.

3. A. *longifolia*. *Roxb.*

Twining. *Leaves* linearly-cordate, sagittate, with the barbs, or lobes rounded, three-nerved, entire and smooth. *Racemes* axillary. *Stigma* cup-shaped, with a three-toothed margin.

A native of the Moluccas.

4. A. *bracteata*. *Retz. Obs.* v. *N.* 80. *Willd.* iv. 160.

Perennial. *Stem* and *branches* weak, trailing. *Leaves* reniform. *Peduncles* axillary, one-flowered, bracted.

*Teling.* Gardi Gavapoo.

A native of cultivated, generally, garden ground, and the banks of rivers, or water-courses, where it can have a rich, moist soil, on the coast of Coromandel. It flowers most part of the year.

*Root* perennial, long, slender, simple, perpendicular, waved, with many small fibres issuing from every part of it. *Stems* or *branches* several, weak, resting on the ground, waved, striated, from twelve to eighteen inches long. *Leaves* alternate, petioled, kidney-formed, beautifully, though slightly, curled round the margin, a little rugose, glaucous underneath; about two inches each way. *Petioles* channelled. *Flowers* axillary, single, peduncled. *Peduncles* drooping, near the base there is a kidney-shaped, curled, sessile bracte. *Corol*, upper part of the tube and tongue erect; the latter has its margins revolute; the colour a most beautiful dark purple, and covered on the inside with hairs of the some colour. *Anthers* six pair. *Capsules* ovate.

Every part of this plant is nauseously bitter, which remains long, chiefly about the throat.

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For a purging with gripes, two of the fresh leaves are rubbed up in a little water, and given to an adult for a dose, once in twenty-four hours.

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# CLASS XXI.

## MONOECIA MONANDRIA.

*AMBROSINIA. Schreb. gen. N.* 1383.

*Spathe* one-leaved. *Calyx* none. *Corol* none. *Stamina* inserted round the top of the style. *Capsule* many-seeded.

1. A. *ciliata. Roxb.*

*Leaves* long-petioled, lanceolar. *Spathe* shorter than the leaves, with a tubular base, and expanding, ciliate apex. *Capsule* six-celled.

*Beng.* Kerali.

Found on the wet banks of rivulets, ponds, and wet places in Bengal. Flowering time the hot season.

*Root* perennial, perpendicular, tuberous, stoloniferous with long fleshy fibres. *Leaves* radical, petioled, lanceolate, veinless, somewhat fleshy, from six to thirty-six inches long. *Petioles*, upper half cylindric, lower half sheathing; some spathaceous bractes surround their lower parts. *Scapes* axillary, solitary, short, somewhat compressed. *Spathe*, base tubular, and somewhat gibbous, middle portion cylindric, and convolute; *apex* expanding, sub-lanceolate; *margins* ciliate with a long, flexible purple filament; the lower tubular portion where the fructification is lodged is half separated by a



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transverse membrane from the upper portion as in A. *spirale*, *Filaments* none. *Anthers* numerous, sessile, surrounding the lower portion of the stigma. *Germ* conical, crowned, six-celled as in the ripe state. *Style* cylindric. *Stigma* oblong, apex turbinate, the lower portion surrounded with anthers. *Capsule* rounded, six-furrowed, and crowned with the six corresponding points of the ridges, six-celled. *Seeds* from six to eight in each cell, affixed by their bases to a central receptacle, each is augmented by a large spongy substance, or envelope. *Embryo* erect, furnished with a perisperm, and many subulate cotyledons as in *Pinus*.

2. A. *spirale*. *R.*

*Leaves* petioled, linear-lanceolate. *Spathe* sessile, much shorter than the leaves, twisted. *Capsule* five-celled, at least the germ has five distinct cells.

Arum *spirale*. *Retz. Obs.* ii. *p.* 30-1. *Willd.* iv. 486.

A native of the moist shady banks of ponds, or standing sweet water on the coast of Coromandel.

*Root* perennial, stoloniferous. *Stem* none. *Leaves* radical, petioled, narrow-lanceolar, smooth, from six to eight inches long, and about half an inch broad. *Petioles* sheathing. *Scapes* scarcely any. *Spathe* axillary, about as long as the petioles of the leaves, the lower portion, or chamber of fructification hid and shut; the upper portion thereof open at the base; above shut, and twisted, of a dark purple colour, particularly the inside, and there transversely rugose.

3. A. *retrospirale*. *R.*

*Leaves* linear-lanceolar. *Spathe* first twisted to the right, and there closed; then to the left, and there open. *Capsule* five-celled, five-valved.

A native of the northern parts of Bengal, it delights in a moist soil.

*Root* consisting of white brownish, long, fleshy fibres. *Stem* none. *Leaves* petioled, linear-lanceolar, smooth, entire, from

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six to twelve inches long. *Petioles* enlarging at the base into sheaths for those within. *Scape* scarcely any. *Spathe* inverted round the base of the germ, and rising amongst the leaves to nearly the same length, below the part where the fructification is lodged a little swelled, and half hid in the earth, the next four or five inches erect, cylindric, completely closed, and twisted to the right; above this there is still about one third of the spathe which is open, and much twisted to the left, the whole of a dull green colour on the outside, and streaked with dark purple within. *Corol* none. *Filaments* none. *Anthers* numerous round the stigma or apex of the style, immediately below them are several, sub-cylindric glands in a verticel round the style. *Pistils* in the swelled base of the spathe. *Germ*, superior, conical, five or six-lobed, each lobe crowned with a large gland. *Style* cylindric. *Stigma* firmly united to the semi-partition, which crowns the chamber of fructification. *Capsule* conical, from five to six-celled, from five to six-valved, opening from the apex. *Seeds* a few in each cell.

It comes exceedingly near A. *spirale* in appearance, yet differing very widely from it. First, in the lower part of the spathe being closed and twisted to the right, then the upper portion to the left and open; and in the partition thereof being incomplete. Secondly, in having nectarial glands round the style beneath the anthers. Thirdly, in having a capsule of five or six cells, and a few large seeds in each.

4. A. *unilocularis. R.*

Stemless. *Leaves* linear-lanceolate. *Spathe* as long as the leaves, twisted. *Capsule* one-celled.

*Teling.* Pechika, boora-gadee.

A native of Coromandel, in marshy places, and borders of lakes, where it is partly in sweet water. Flowering time the rainy season.

*Root* fibrous, stoloniferous. Stemless. *Leaves* radical, erect, ensiform, smooth, below expanding to embrace those underneath; from nine to eighteen inches long, and about one broad.

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*Scape* axillary, short, erect, compressed, growing broader towards the apex. *Spathe* as long as the leaves, erect, below convolute; above the spadix twisted like a screw to a very fine, straight point; there is an horizontal partition which separates in a great measure, the upper twisted part from the gibbous part below; colour of the outside purplish, that of the inside much deeper, and beautifully spotted with darker spots. *Corol* none. *Nectary*, four or five oval, anther-like glands, crowning the top of the germ, round the style. *Filament* scarcely any visible. *Anthers* very numerous, surrounding in form of a globe the top of the style just below or even touching the partition. *Pistil*, in the lower convolute belly of the spathe. *Germs* conical. *Style* filiform, the length of the belly of the spathe. Its apex is firmly united to the horizontal partition above-mentioned. *Pericarp; capsule* leathery, conical, one-celled, one-valved. *Receptacle* conical, affixed at the base and apex, free round the sides. *Seeds* numerous.

### *ARUM. Schreb. gen. N.* 1387.

*Spathe* one-leaved, cowled. *Spadix* or *receptacle* with the female florets round the base, stamineous about the middle and naked above.

#### SECT. I. *With simple Leaves.*

1. A. *colocasia. Willd.* iv. 481.

Stemless. *Leaves* peltate, ovate, repand, semi-bifid at the base. *Scape* shorter than the petioles. *Spathe* much longer than a spadix, cylindric, erect; *club* sub-cylindric, length of the antheriferous part of the receptacle. *Anthers* many-celled.

*Sans.* Kuchoo.

*Beng.* Goori-Kuchoo.

A. *Ægypticum. Rumph. Amb.* v. *t.* 109.

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*Teling.* Chama-Kura.

There are two varieties of this species cultivated in the vicinity of Calcutta, viz. Goori-Kuchoo just mentioned, and *Asoo* or early Kuchoo: small offsets from the larger tubers are, like potatoes, planted about the beginning of the rains in May or June, in a well laboured, friable, rich soil, not subject to be inundated. The roots of *Asoo* Kuchoo are taken up about the close of the year; those of Goori-Kuchoo, in February and March. Besides these two, there are three wild varieties of this species, found in most parts of India, viz.

1*st.* Kalla or dark-coloured Kuchoo, found on the edges of ditches, and other wet places. The leaves and the petioles are more or less tinged with purple, and the roots never swell in the manner the cultivated varieties do, but send out numerous runners. The leaves, and their foot-stalks, are the parts chiefly eaten by the natives of Bengal.

Caladium aquatile. *Rumph. Amb.* v. *t.* 110. *f.* 1. seems to be this variety.

2*d.* Char-Kuchoo, grows on dry ground, chiefly by road sides, on dung hills, and among rubbish, it differs from the other varieties in having the disk of the leaves marked with dark purple or bluish black clouds.

3*d.* Bun-Kuchoo. In situation and form every way like the last, but of an uniform green colour. The last two are rarely eaten by the natives of Bengal, where better vegetables are plentiful and easily procured.

Caladium vicorum. *Rumph. Amb.* v. *p.* 318.

2. A. *nymphæifolium. R.*

Stemless. *Leaves* peltate, ovate repand, semi-bifid at the base. *Scape* shorter than the petioles. *Spathe* much longer than the spadix, sub-cylindric, erect; *club* slender, acute, scarcely half the length of the antheriferous part of the receptacle. *Anthers* many-celled.

Caladium *nymphæifolium. Willd.* iv. 488.

*Beng.* Sar-Kuchoo.

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Weli-ila. *Rheed. Mal.* xi. *t.* 22.

I doubt if this can be reckoned any thing more than a large aquatic variety of *Colocasia.* In Bengal it is rarely cultivated, but found wild in abundance on the borders of lakes, and pools of fresh water. Every part of this plant is eaten by the Hindoos. The root or rather subterraneous stem, often grows to the length and thickness of a man's arm. The petioles, scape and leaves, are of a reddish colour, and the plants considerably larger than any of the varieties of *Colocasia* just mentioned; yet the leaves are narrow in proportion to their breadth. The only good specific mark to know it from *Colocasia* by, is the shortness of the club of the spadix.

3. A. *viviparum. Roxb.*

Stemless. *Leaves* peltate, cordate, acuminate. *Root* flagelliferous and these runners bearing scaly, viviparous bulbs in clusters.

Maravara Tsjembo. *Rheed. Mal.* xii. *t.* 9.

A native of Nepal as well as Malabar. From the former place Dr. Buchanan sent the minute bulbs to this garden, where they produced complete plants in a short time and though now eight years old, have never blossomed; nevertheless, in Nepal, Dr. Buchanan observed they bore the common flower of the *Arums;* hence there can be no doubt of the genus. Here they produce annually in the rainy season abundance of the bulbiferous radical spikes, and by these the plant is readily propagated.

*Root* biennial, or more, consisting of a small, roundish tuber, which is abundantly furnished with the usual fibres, while from its apex the foliage rises; and round its sides the flagelliform, bulbiferous spikes issue. *Stem* none. *Leaves* petioled, peltate, cordate, entire, acute, smooth on both sides; posterior lobes obtuse; from four to twelve inches long, and from three to eight broad. *Spikes* or *runners* from the body of the tuberous root, some simple, leafless shoots issue, they are about as thick as a quill, run for a few inches, just under

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the surface of the earth, and there strike root, after which they rise from six to twelve inches nearly erect, and bear numerous, approximate fascicles of small, sessile, scaly, proliferous bulbs. *Bulbs* oblong, green, the size of a small berberry, vegetating readily when committed to the earth; when they chance to remain any length of time on the spike, other bulbs are formed in the axills of the scales, the whole forming a little round head of these bulbs. *Scales* (of the bulbs) imbricated, ovate, each ending in a pretty long, hooked bristle, by which they readily adhere to whatever touches them, and thereby are widely spread.

4. A. *rapiforme. R.*

Herbaceous, stemless. *Roots* tuberous, turnip-shaped. *Leaves* cordate, sub-repand. *Spadix* nearly as long as the concave spathe. *Anthers* many-celled.

A native of Pegu, introduced by the Rev. Mr. F. Carey, into the Botanic garden, where it blossoms during the rains. It differs from A. *montanum*, the only species known to me, for which it can be mistaken, most conspicuously in the shape and nature of the root; in other respects their size and habit are much alike.

5. A. *montanum. R.*

Stemless. *Root* a sub-cylindric tuber. *Leaves* cordate, repand, polished. *Spadix* nearly as long as the cucullate, coloured spathe. *Anthers* many-celled.

A native of the mountainous forests of the Northern Circars, where its root is said to be employed to poison tigers.

I long considered this to be A. *macrorhizon*, but changed my opinion on observing that Forster, who must have seen and examained that species in its recent state, says, the florets are hermaphrodite; there being six sessile, twin anthers surrounding each germ, and that the stigma is orbicular. There are no traces of stamina, anthers or glands round the germs of my plant; and the stigma is regularly three or four-



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lobed. In short, a very perfect *Arum*, or *Caladium* according to Ventenat.

6. A. *Indicum. Lour. Cochin Ch.* 655.

Caulescent, erect. *Leaves* cordate, base bifid; *lobes* approximate and rounded. *Spadix* cylindric, equalling the linear, boat-shaped, spathe. *Club* cylindric, longer than the rest of the spadix.

*Beng.* Man-Kuchoo.

Man-guri, a variety with the petioles of the leaves darker coloured.

A native of various parts of South Asia. In Bengal it is much cultivated about the huts of the natives, for its esculent stems, and small pendulous bulbs, or tubers, these being very generally eaten by people of all ranks, in their curries, &c. Flowering time the close of the rains, and beginning of the cool season.

*Root* fibrous, with numerous suckers intermixed, particularly near the surface of the soil, these end in little solid, edible bulbs, by which the plant is most readily and abundantly multiplied; numerous, thick, fleshy, radical fibres also issue from all the lower part of the stems. *Stems* from one to two feet in circumference, simple, various in length according to age, but are rarely found more than a foot, or eighteen inches to the leaves, as they are seldom suffered to attain to their full size, which from what I have seen, and the information I have been able to obtain, may be from six to eight feet. *Leaves* on erect, long petioles, cordate, bifid at the base, with the lobes approximated, and rounded; *apex* also rounded, with a bent down, dagger-shaped point, smooth on both sides; *margin* waved; from two to three feet long, strongly marked, underneath an elevated whitish rib, and simple veins of the same colour. *Petioles* the length of, or longer than the leaves, smooth, the lower part sheathing, the upper round and tapering a little, transversely clouded, particularly the variety called Man-guri. *Flowers* axillary and always in

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pairs, large, though rarely so much elevated as the petioles of the leaves, almost inodorous, and the little smell they have is rather offensive. *Bractes* a large, loose sheath embracing each of the sub-cylindric, smooth scapes. *Spathes* linear, before expansion sub-cylindric, a little gibbous at the base, smooth on both sides, of a pale greenish yellow, obtuse, or almost truncate, with a small subulate acumen; from eight to twelve inches long. *Spadix* cylindric, the length of the spathe, the cylindric part rather obtuse, pale yellow. *Club*, or *neuter* part, longer than all below it. *Anthers* numerous, occupying about two inches of the spadix between the club and germs, sessile with from eight to twelve polliniferous cells round the sides, which open rather under the apex on the outside. *Germs* numerous round the conic base of the spadix, ovate, one-celled, containing several ovula attached to the bottom of the cell. *Styles* none. *Stigma* three or four-lobed, yellow.

There is a variety of this stately useful plant distinguished from the one figured, by being of rather a darker colour, particularly the petioles. These are both propagated by the little pendulous bulbs, or tubers; and rarely produce ripe seed.

7. A. *odorum. R.*

Caulescent. *Leaves* cordate; *base* bifid; *lobes* rounded. *Flowers* in axillary pairs. *Spadix* equalling the cymbiform spathe, club one third the length of the whole spadix. *Berries* one-seeded.

From Pegu this most stately species of *Arum*, *Caladium* of Ventenat, was sent by the Rev. Mr. Felix Carey, to the Botanic garden at Calcutta, where it thrives luxuriantly, and blossoms from the close of the rains till January, ripening its seed in March and April. The flowers possess a considerable degree of fragrance which to most people is agreeable, a rare quality in the flowers of an Indian *Arum*.

*Root* consisting of long, far spreading, fleshy fibres. In this



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I have not found any of the small bulbs so common in A. *Indicum*, which this species resembles so much. *Stem* simple, straight, as thick as a man's arm, height of the stem in two years about two feet, marked with the circular cicatrices of the fallen leaves; height of the whole plant, to the top of the leaves, from six to eight feet. *Leaves*, cauline petioled, ovate, cordate, cloven at the base; *apex* obtuse with an incurved point, lobes rounded; *margins* somewhat waved, polished on both sides; *rib* and *vein* large and elevated underneath; from two to four feet long, by two or three broad. *Petioles* from two to three feet long, the lower half sheathing; the upper part sub-cylindric, smooth, polished, of an uniform green in every part. *Peduncles* axillary, intermixed with some spathiform bractes, nearly round, rather shorter than the petioles, one-flowered, regularly two in each axill. *Spathe* erect, the lower part thick, gibbous, convolute and permanent; the exterior portion boat-shaped with a short acute apex, both sides smooth and of a pale green colour, this portion drops soon after flowering time, while the lower portion remains till the seeds are ripe. *Spadix* nearly as long as the spathe, subcylindric, club about one third part the length of the whole spadix. *Nectaries*, many flat, rhombiform glands on the contracted part of the spadix, between the germ and the spadix. *Anthers* numerous, rhombiform, with ten or twelve polliniferous ones round the margin cells, these open by a slit on the outside of their apices. *Germs* numerous on the conic base of the spadix, four-celled, with two or three ovula in each attached to the bottom of the cell. *Style* none. *Stigma* roundish. *Berry* numerous, size of a small cherry, shape more or less round according to the number of seeds, smooth, of a shining scarlet, one-celled, the growth of the seeds having destroyed every vestige of the partitions which were present in the germ. *Seeds* generally from one to four, roundish, smooth. *Integument* single, in the recent state soft and spongy. *Perisperm* conform to the seed, cartilaginous. *Embryo* simple, obconical, with the obtuse end close to the apex of the seed and there not covered by the perisperm.

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8. A. *cucullatum. Lourier. Cochin Ch.* 656.

Caulescent, ramous. *Leaves* sub-peltate, exactly cordate, acute, with the lobes exquisitely rounded and convex, or concave, from their margins being contracted. *Scape* half the length of the petioles. *Spadix* cylindric, nearly as long as the cymbiform spathe.

A native of Bengal, but rare about Calcutta; some plants in a good soil, in the Botanic garden have in seven years acquired numerous divided stems, from one to two feet in length; those on the outside are in general so much bent outward, as to rest on the ground.

*Leaves* long-petioled, somewhat peltate, exactly cordate, pointed, entire, and very smooth on both sides; with large prominent nerves underneath; *lobes* perfectly semi-circular, concave, from the margins being much contracted, the whole leaf from six to twelve inches long. *Petioles* sheathing for a little way near the base, the rest perfectly round, tapering, and of a uniform green colour; the whole length from one to three feet. *Scapes* axillary, scarcely half the length of the petioles, round, tapering, like the petioles. *Spathe* convolute, fleshy, and green at the base, above open, boat-shaped, and yellow. *Spadix* shorter than the spathe, cylindric, except the short club, which tapers a little to an obtuse point. *Filaments* none. *Anthers* as in *Caladium*, composed of from eight to ten, sub-cylindric, polliniferous cells, arranged round a spongy centre, each perforated at the apex to let the pollen pass. *Germs* in this species very indistinct.

9. A. *fornicatum. R.*

Caulescent. *Leaves* peltate, narrow-cordate, with the lobes angle-rounded. *Spadix* clavate; *upper* half of the *spathe* vaulted, equalling the spadix. *Berries* with from one to three seeds.

Kucheree of the Inhabitants of Chittagong; it is called Bees Kuchoo about Calcutta.

A native of Bengal and Chittagong, where it blossoms during the rainy season.

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*Root* fibrous. *Stem* erect or ascending, from one to three feet in length, marked with cicatrices of the fallen leaves, four or five inches in circumference, the height of the whole plant from three to six feet. *Leaves* from the apex of the stem, petioled, narrow cordate, peltate, acute-pointed; *lobes* angular, with the angles rounded, margins a little waved, smooth, of a shining green on both sides; from eight to twelve inches long, by six or eight broad. *Petioles* sheathing at the base, the rest round, smooth, clouded, and tapering, length various. *Scape* axillary, shorter than the petioles, round, smooth, tapering, and clouded like the petioles. *Spathe*, the lower part permanent, ovate, fleshy, and closely enveloping the germs; the *upper portion* expands into an oblong, pale greenish vault, crowned with a subulate point, smooth on both sides, this portion is deciduous with that portion of the spadix which is above the germs. *Spadix* clavate, rather, if any, shorter than the spathe. *Anthers* numerous, occupying a large portion of the spadix immediately above the nectarial glands, each consisting of eight or twelve small, sub-cylindric cells forming angles on the sides; these contain the pollen and have each a small perforation at the apex for its exit. *Germs* many, round the base of the spadix only. *Nectarial filaments* no other than some variously shaped compressed glands round the contracted part of the spadix, between the anthers and germs. *Berries* numerous, with generally from one to three seeds in each.

I do not find that this species is employed as an article of diet, but it is, I am told, used medicinally.

10. A. *flagelliformis. R.*,

Stemless. *Leaves* sagittate; *lobes* spreading. *Spathe* and *spadix* equal, whip-shaped. *Nectarial scales* coloured. *Anthers* two-lobed, two-celled.

A native of Bengal, where it is found on damp, shaded, pasture ground. Flowering time the rainy season.

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11. A. *divaricatum. Willd.* iv. 482.

Stemless. *Leaves* cordate-acuminate. *Spathe* longer than the subulate spadix, with a slender, drooping, spiral apex. *Nectarial filaments* simple, subulate and incurved.

Nelen Schena major. *Rheed. Mal.* xi. *t.* 20.

From Canton in China Mr. William Kerr sent this plant to the Botanic garden at Calcutta, where it blossoms freely during the rains, the leaves are not exactly as in Rheed's *Malabaricus*, yet to me they seem the same, or varieties of one species.

*Root* a small, hooked tuber, with many fibres from its union with the rest of the plant. *Stem* none. *Leaves* radical, petioled, oblong sagittate, acuminate; *margins* waved, smooth on both sides; *lobes* divaricate, but little, and rather obtuse; from four to six inches long, by two or three broad. *Petioles* nearly as long as the leaves. *Scapes* solitary, axillary, much shorter than the petioles. *Spathe* longer than the spadix, recurvate, toward the base campanulate, beyond the middle tapering into a long, slender, drooping, spiral point; of a deep beautiful crimson on the inside; on the outside ferruginous, green. *Spadix* nearly erect. *Club* subulate, acute, the colour of the inside of the spathe. *Stamens; filaments* none. *Anthers* a few near the base of the club, and nearly an inch above, a crowded tuft of simple, subulate, incurved, nectarial filaments, two-lobed; *lobes* grooved on the outside, and open on the apex. *Germs* few and occupying a short space of the base of the spadix, just under the nectarial filaments, one-celled, and containing a single ovulum, attached to the bottom of the cell. *Styles* none. *Stigma* flat.

12. A. *orixensis. Roxb.*

Stemless. *Leaves* three-lobed. *Flowers* sub-sessile. *Spathe* ample, erect, longer than the spadix. *Nectarial filaments* long, and often ramous.

*Beng.* Ghekool.

Arum trilobatum. *Lourier. Cochin Ch.* 534.

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*Teling.* Surei Kunda.

A native of the shady mango groves, near Samulkota, where the soil is pretty dry, and fertile. Flowering time the beginning of the rains.

*Root* perennial, tuberous, nearly round, the size of a pullet's egg, white, with small inequalities, many fibres issue from the the apex, round the insertion of the leaves, and flower; stemless. *Leaves* radical, petioled, deeply three-lobed; *lobes* ovate, pointed, a little scolloped, smooth, round the under side, parallel with the margins and near it runs a double nerve about eight or ten inches broad, and the same length. *Petioles* erect, round, tapering, striated, about twelve inches long at the base, vaginated, and embracing one another. *Scape* axillary, very short, just sufficiently long to elevate the spathe above the ground. *Spathe* shorter than the petioles, striated, erect; the inside red; the outside herbaceous green. *Spadix*, the base surrounded with the germs, crowned with many, yellow, ramous filaments; the middle swelled with the anthers, above them there is no second order of filaments. *Club* scarlet coloured, as long as all the rest of the spadix, erect, tapering, subulate, from a concave broad base, to a point which is neither obtuse nor sharp.

*Note.* This seems to me to differ from *divaricatum* and *trilobatum*. From the former in having deeply three-lobed, pointed leaves, and excessively acrid roots; and from the latter not only on account of the different form of the leaves, but because here the spathe is erect, with a straight point; there drooping, with the long point twisted like a screw; here are also ramous fibres growing on the germs.

The roots (when fresh) are exceedingly acrid, more so than those of A. *Dracunculus*, or *maculatum*. The natives apply them in cataplasams, to discuss or bring forward scirrhous tumours. They also apply them externally to the bite of venomous snakes, at the same time giving inwardly about the size of a field bean.

It is certainly a most powerful stimulant, in proper hands

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it might no doubt be used to great advantage in the cure of several disorders.

13. A. *trilobatum. Willd.* iv. 483.

Stemless. *Leaves* three-lobed. *Flowers* sub-sessile. *Spathe* ample, with its apex spiral, and resting on the earth. *Nectarial filaments* short, simple and recurved.

Arisarum Amboinicum. *Rumph. Amb.* v. *t.* 110. *f.* 2.

The roots came accidentally from the Moluccas, amongst the earth that some other plants were brought in, for the Botanic garden. Flowering time in the Botanic garden, the beginning of winter.

*Root* tuberous. *Stem* none. *Leaves* radical, the most exterior ones deeply three-lobed, almost ternate, the interior ones triangular, all are smooth on both sides; from four to six inches long, and nearly the same in breadth. *Petioles* near the leaf sub-triangular, below sheathing, smooth, about as long as the leaves. *Scape* from the centre of the leaves, very short. *Spathe* rather longer than the spadix, spreading horizontally with its twisted apex resting on the ground. *Nectarial filaments* recurved, short, and simple. *Germs* on a conical receptacle, the base of the spadix being so formed.

In *Arum orixensis*, which this plant looks like, the receptacle of the germs is cylindrical, with a long ramous filament, crowning its upper edge, this alone is a sufficient distinguishing mark.

14. A. *gracilis. R.*

Stemless. *Leaves* deeply three-parted, or sub-ternate; *lobes* acute; the middle one oblong, lateral, semi-hastate. *Spathe* flagelliform, the length of the flagelliform spadix. *Nectarial filaments* simple, and revolute.

Katu-schena. *Rheed. Mal.* xi. *t.* 21.

A native of Silhet, where it is known by the name *Harpung*, and used medicinally. Flowering time the hot and the rainy seasons.



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SECT. II. *With compound Leaves.*

15. A. *cuspidatum. R.*

Stemless. *Leaves* ternate; *leaflets* equal, lanceolate, cuspidate. *Scapes* as long as the petioles. *Spathe* longer than the subulate pointed spadix. *Anthers* from four to five, in a peltate circular crown on each filament.

A native of Pulo Pinang, where Mr. W. Roxburgh first discovered this uncommonly fine species, and sent the roots to the Botanic garden where the plant blossoms in April.

*Root*, a small, tuberous, perennial crown, with long fleshy fibres from its base. *Stem* no other than the lower sheathing portion of the petioles of the leaves, and about three or four inches long. *Leaves* few, petioled, ternate. *Leaflets*, the pair sub-sessile, and semi-lanceolate, the terminal one petiolated, and lanceolate, all ending in long, filiform points, and perfectly smooth on both sides; *margins* entire, but waved, from four to twelve inches long, and from one to three broad. *Scapes* solitary, from the centre of the leaves, about as long, and much like the fine, round, tapering, smooth, beautifully crowded portion of the petioles of the leaves. *Spathe* oblong, the lower half sub-cylindric, faintly clouded, at the base converging; above expanding, pale green and incurved; *apex* filiform. *Spadix* shorter, the spathe, lower half cylindric, and surrounded with stamens; upper half subulate and naked. *Corol* none. *Stamens* numerous; *filaments* very short, thick, and fleshy. *Anthers* generally four, round the apex of each filament. *Pistils*, none can be found on the only plant now in blossom.

16. A. *curvatum. Roxb.*

Stemless. *Leaves* pedate; *leaflets* from ten to twelve, lanceolar. *Spathe* vaulted, half the length of the curved spadix; no nectarial filaments. *Anthers* three-lobed.

*Nap.* Beer-bauka.

A native of Nepal. In the Company's Botanic garden it blossoms in May.

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*Roots* tuberous. *Leaves* radical, two or three, pedate; *segments* from ten to twelve, lanceolar, entire, smooth, veined; about six inches long. *Petioles* very long, the lower four fifths thereof sheathing; the upper part round, tapering, all are smooth, and of a pale green colour, below the petioles are embraced by a sheath or two, these are clouded with white on the outside. *Scape* from three to four feet high, which is rather longer than the leaves, round, smooth, and all but a portion of its apex enveloped in the sheaths of the leaves. *Spathe* half the length of the spadix, its body which embraces the receptacle or flower-bearing part of the spadix, cylindric, above that the remaining part of the spathe projects horizontally over the mouth of the cylindric part, like a large, concave, pointed roof, or lid, striated, otherwise smooth, and of an uniform pale green on both sides. *Spadix* the receptacle may be about a fourth of the whole, it is erect, above that it bends out downwards, then upwards, ending in a long, erect, naked club, or rather whip. *Stamens* occupying the upper two thirds of the receptacle. *Filaments* short, diverging. *Anthers* large, three-lobed, with two polliniferous pits in each lobe. *Germs* numerous, &c. as in the genus.

17. A. *sessiliflorum. Roxb.*

Stemless. *Leaves* pedate; *leaflets* about nine, broad-lanceolate, entire. *Flowers* sessile, appearing when the plant is destitute of foliage. *Spathe* revolute, twice the length of the long, tapering, erect, acute spadix. *Nectarial filaments* clavate. *Anthers* two-lobed. *Berries* from one to two-seeded.

A native of the country about Cawnpore, from thence introduced by Colonel Hardwicke into the Botanic garden in January 1803, where the plants blossom freely during the dry, hot season.

*Root* of the shape and size of a small turnip, with small knobs, or offsets, growing from it, of a light brown. *Leaves*, which appear many weeks after the flowers decay, pedate and



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about two feet high. *Leaflets* generally nine, broad-lanceolate, entire, smooth, from three to nine inches long. *Petioles* round, smooth, tapering, clouded with pale dull purple; from six to eighteen inches long. *Scape* very short, and entirely hid under the surface of the earth. *Spathe* sessile, indeed its gibbous base is rather immersed in the earth, for four or five inches above the swelling, erect, cylindric and entire; then reclinate, and open, the edges variously dentate, somewhat curled, more deeply coloured, and soon becoming involute. *Spadix* scarcely half the length of the spathe, deeply coloured at the base, conical, and there covered with germs. *Nectarial filaments* clavate, crowning the germs; from thence two-lobed, two-celled, sessile. *Anthers* naked, cylindric, occupying about two inches. *Club* straight, from six to eight inches long, highly coloured, slender and acute. *Germs* obovate, one-celled, containing two ovula, attached to the bottom of the cell. *Berries* turbinate, smooth, polished, crimson, one or two-seeded.

18. *A. lyratum. Roxb.*

*Root* turnip-shaped, stemless. *Leaves* compound; *first divisions* sub-ternate; *leaflets* lyrate, smooth.

*Teling.* Udavee-Kundee.

Grows in moist places amongst the Circar mountains.

*Root* tuberous, pretty smooth, and something like a large potato. *Leaves* radical, one, two, or three, petioled, tripinnatifid; *divisions* very unequal; the *exterior* ones compound, larger than the others, pointed, and obliquely oblong, sometimes scolloped, smooth; the *inferior* ones small, and obtuse. *Petioles* one or two feet long, striated, clouded, swelled at the base; and there sheathing. *Berries* the size of a small cherry, red, smooth, one-seeded.

The roots are eaten by the natives of the mountains, but require two or three boilings and some particular care in the dressing to render them inoffensive, and nourishing.

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19. A. *campanulatum. Roxb.*

Stemless. *Leaves* decompound. *Flowers* sessile, with respect to the surface of the ground, and appearing when the plant is destitute of leaves. *Spathe* the length of the spadix, campanulate, with curled margins, no nectary; *club* broad-ovate, lobate. *Anthers* two-celled.

*Sans.* Kunda or Kulla.

*Teling.* Manchi kunda.

*Beng.* Ol.

Tacca sativa, *Rumph. Amb.* v. *p.* 324. *t.* 112, the root and leaf, and Tacca phallifera, *t.* 113. *f.* 2. the flower, at which period not a leaf is to be found. Schena and Mulen-Schena. *Rheed. Mal. p.* 11. *t.* 18, and 19.

Found wild in damp places in the woods near Calcutta; flowering time the beginning of the rains.

*Root* perennial, tuberous, roundish, covered with a dark brown skin, frequently, when in a good soil, as large as a child's head; from various parts of the chief root, there issue small tuberosities, which are employed as offsets, to cultivate the plant by. *Leaves* radical, for the most part only one or two, thrice-bifid; *divisions* outwardly pinnatifid; *segments* obliquely oblong, pointed, smooth; size very unequal; the *exterior* one being always longer than the inferior one, the whole leaf is from one to three feet each way. *Petioles* round, tapering, with darker coloured green, pretty smooth, clouded as long as the leaves. *Spathe* very large, leathery, campanulate; the *border* curled; smooth on both sides; the *outside* near the base pale green; the *middle part* deeper green, and towards the margin greenish purple; the *bottom* deep dotted purple; the *spadix* about as long as the spathe, the lower third or pistiliferous part cylindric; the middle third or staminiferous portion somewhat turbinated, the club or upper third part very broad, short, conical, or sub-globular, of a dark purple colour, variously lobate, and wrinkled like a dried truffle, in large plants this part is six inches in diameter, and four in perpendicular height. *Filaments* none.

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*Anthers* numerous, closely impacted round the turbinate or middle portion of the spadix, linear, two-celled, with two corresponding openings at the apex, at which to discharge the disk or pollen; the immense quantity thereof that spews out from these openings and drops down in the pistils, is really inconceivable. *Nectarial filaments* none. *Germs* numerous, roundish; *styles* subulate, thick-coloured; *stigmas* large, yellow, downy, two-lobed. *Berries* numerous, long, obovate, red and covered with a considerable portion of pulp. *Seeds* one or two in each berry.

This species is much cultivated in the Northern Circars, and highly esteemed for the wholesomeness, and nourishing quality of the roots. It deserves to be called the *Telinga potato*. The usual time of cultivation is immediately after the first rains, in June. A very rich loose soil suits it best; where the swelling of the root meets with little obstruction, and where they draw the greatest nourishment, for which reason it requires to be very well, and repeatedly ploughed. The small tuberosities that are found in the larger roots, are what they employ for sets, and are planted in the manner potatoes are in England, and about the same distance from one another. In twelve months they are reckoned fit to be taken up for use. The larger roots will then weigh, if the soil has been good, and the season favourable, from four to eight or more pounds each, they keep well if they are kept dry, and are by the natives employed as food, in the same manner as the common yam.

20. *A. bulbiferum. Roxb.*

*Root* tuberous, stemless. *Leaves* decompound; *bulb*-bearing. *Spathe* cauled, rather longer than the cylindric spadix, no nectaries.

*Beng.* Umla bela.

A native of Bengal, and plentiful in the woods in the vicinity of Calcutta, where it blossoms in May, at which time nothing more of the plant is to be seen than the inflorescence;

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soon after the decay of the flowers, the leaves make their appearance, and continue during the rainy season.

*Root* perennial, turnip-shaped, and about the same size with fleshy fibres from every part, particularly the crown. *Stem* none. *Leaves* radical, generally single, long-petioled, commonly divided into three, petioled, once or twice dichotomous, pinnatifid, though in stunted plants they are frequently trigeminate. *Leaflets* broad-lanceolar, acute, entire, smooth, the breadth of the whole leaf is often four feet; small, compressed, round bulbs are almost always present on the upper side of the divisions of the leaves. *Petioles* from one to four feet long, round, smooth, clouded, tapering a little towards the top. *Scape* erect, from the crown of the root, round, smooth, about six inches long, beautifully clouded with olive, and pale orange tinged with pink. *Spathe* cauled, ovate when taken off and spread, smooth on both sides; at the base on the outside clouded like the scape; above and on the inside pink. *Spathe* cylindric, nearly the length of the spadix, club obtuse, and about one third of the whole, buff-coloured. *Filament* none. *Anthers* two-celled. *Nectaries* none, nor any intermediate space between the stamens and pistils. *Germs* roundish, two-celled, one of which even in the germ is for the most part abortive, the other contains one curved ovulum, attached to the bottom of the cell. *Style* scarcely any. *Stigma* four-lobed. *Berries* one-seeded.

21. A. *sylvaticum. Roxb.*

*Leaves* super-decompound; *leaflets* lanceolate. *Spadix* straight, two or three times longer than the short, gibbous campanulate spathe. *Anthers* two-celled.

*Teling. Udavee chaina.*

A native of the mountainous parts of the Circars. Flowering time the wet season.

*Root* perennial, tuberous, nearly smooth like a potato. *Stem* none. *Leaves* radical, one or two, petioled, thrice two or more lobed; *lobes* pinnatifid; *segments* lanceolate, smooth.

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The whole leaf is from eighteen to thirty inches each way. *Petioles* erect, from one to two feet long, smooth, clouded. *Petioles* winged. *Scape* erect, round, the length of the petioles, smooth. *Spathe* one third the length of the spadix, opening at, and near the apex only. *Club* thrice the length of the rest of the spathe, tapering to a long subulate point. *Stamens* numerous, occupying about two inches of the spadix, just within the apex of the spathe, singly sessile, and roundish, with two polliniferous cells, which open on the apex. *Nectary*, some smooth, irregular, glandular bodies are placed between the stamens and germs. *Germs* numerous, globular, surrounding an inch of the base of the spadix, they have the rudiments of three ovula. *Style* very short. *Stigma* large, three-lobed, glutinous, yellow. *Berries* one, two or three-seeded.

*Note.* Roots brought from the mountains grew and flowered in my garden at Samulkota, but it is perfectly unknown to the natives of the low country. I am therefore ignorant of its uses.

22. A. *margaritifer. Roxb.*

Herbaceous, stemless. *Leaves* trifid, with entire, narrow-lanceolate, pinnatifid segments. *Spathe* campanulate, equalling the obtuse spadix; *nectaries* like large pearls.

A native of Hindoostan, from thence introduced into the Botanic garden, where it flowers in May, and June, sometimes before the leaves appear.

*Root* a roundish, solid tuber, which produces roundish offsets in every part; size various; six inches in diameter. *Leaves* decompound; *segments* narrow, lanceolate, entire, acuminate. *Scape* straight, erect, cylindric, as thick as a man's thumb, and about two feet long, variegated, with deeper and lighter green. *Base* embraced by one, two, or three withering sheaths. *Spathes* sub-campanulate, obtuse, the length of the spadix, smooth; the prevailing colour a pale greenish yellow, with the bottom of the bell dark pur-

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ple. *Spadix* cylindric, obtuse, every part occupied. *Anthers* obovate, two-celled, with gaping slits at top, occupying nearly the upper half of the spadix, to its very apex. *Nectaries* solid, obovate, smooth, pearl white, occupying about one fourth of the middle of the spadix, between the anthers, and germs, as if studded with large pearls. *Germ* ovate, two-celled, with one ovulum in each, attached to the lower and inner angle of its cell. *Style* short. *Stigmas* large, round, with a small division at top; clammy, yellow.

*CALLA. Schreb. gen. N.* 1388.

*Spathe* one-leaved. *Spadix* covered with florets. *Calyx* none. *Corol* none. *Berries* many-seeded.

1. C. *aromatica. R.*

Caulescent. *Leaves* sub-sagittate, cordate, acuminate; *lobes* rounded and divaricate. *Spadix* cylindric, obtuse, equalling the spathe; above male, below female, with abortive stamina intermixed; *anthers* many-celled.

Cuchoo-gundubee, is the vernacular name in Chittagong, where it is indigenous. In the Botanic garden it is in flower the whole year. When cut it diffuses a pleasant aromatic scent, something like that of the *scitamineous* tribe; the medicinal virtues of the root are in high estimation amongst the natives, and they sell from ten to sixteen rupees the maund.

*Root*, the body or tuber is a continuation of the stem when the plants are old enough to have one, invested in the old withered sheaths of the leaves, with numerous, long, white, fibrous cords issuing from every part. *Stem* short and of a slow growth. *Leaves* radical; long petioled, shape between cordate and sagittate, acuminate, lucid; *lobes* rounded and rather remote from each other, general length about twelve inches, and little more than half of that in breadth. *Petioles* with a sheathing base, and smooth, as in the order. *Flowers* many together from the axills and centre of the leaves,



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their whole length, scape included, scarcely half the length of the petioles, the usual bractes intervene between the round, smooth, uniform, green scapes. *Spathe* sub-cylindric, rather obtuse, with an acumen, smooth on both sides, of a pale greenish yellow. *Spadix* sub-cylindric, obtuse, equalling, or rather longer than the spathe; the upper two thirds covered with sessile, many-celled anthers; the lower third with the germs intermixed with about as many abortive stamina as there are germs. *Germs* ovate, seemingly two, or three-celled, but as the receptacles are parietal and do not unite in the centre, I can call them only one-celled ovula, many attached to the exterior half of the parietal receptacles. *Style* none. *Stigma* two or three-lobed. *Berries* oblong, not unlike a large berberry, and rarely containing more that a single seed.

Is readily multiplied, by offsets from the body of the root.

2. C. *calyptrata. Roxb.*

Stemless. *Leaves* oblong, cordate. *Spathe* circumcised, the upper conical portion falling when early in blossom. *Spadix*, the upper half clavate and covered with stamina, the lower half cylindric, and female.

Arisarum esculentum. *Rumph. Amb.* v. *t.* 111. *f.* 1.

A native of Amboyna, from thence introduced into the Botanic garden, where it blossoms in May.

*Root* a small, oblique, oblong tuber with ramous fibres. *Stem* none. *Leaves* oblong, cordate, smooth on both sides, subulate, pointed, with a single slender vein round the margin; from five to seven inches long, and about three broad. *Petioles* sub-cylindric, shorter than the leaves. *Scape* shorter than the sheathing portion of the petioles, which embrace it on opposite sides. *Spathe* a little longer than the spadix, at the base round the germs convolute and green; the upper portion separating and dropping from the lower, when the anthers begin to discharge their pollen, splitting round the base into various portions, is of a tender somewhat fleshy texture, a

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pale yellow colour, and smooth on both sides. *Spadix* with germs only round, the lower half a small portion at the middle contracted, and naked, above clavate and covered with anthers. *Filament* none. *Anthers* numerous, cuneate, with two polliniferous pores at top. *Germs* numerous, from two to four-lobed. *Style* none. *Stigma* glandular, scarcely elevated above the germs.

3. C. *rubescens. R.*

Caulescent. *Leaves* cordate, base bifid. *Spathe* contracted, acute, equalling the spadix. Lower third of the spadix covered with germs, and clavate corpuscles intermixed; the upper two thirds covered with anthers only.

Dracunculus amboinicus. *Rumph. Amb.* v. *t.* 111. *f.* 2.

A native of Chittagong, and from thence sent to the Botanic garden at Calcutta by Dr. Buchanan, in 1797, where it blossoms in August 1801.

*Root* of numerous, long, fleshy, spreading fibres. *Stem*, the largest plant in the Botanic garden has in four years got one of about three inches in length only, and half that in diameter, and as yet surrounded with the withered, stem-clasping bases of the old leaves, through these pass the thick fleshy fibres of the root, which descend into the ground. *Leaves* many, horizontal, petioled, sagittate-cordate; *lobes* obtuse, margins very entire, and without the inner marginal vein common to most of this order, point acute; from six to twelve inches long, and from three to six broad, in general slightly tinged with red, particularly round the margins. *Petioles* erect, below deeply channelled and embracing those within, above tapering gently, and there very slightly channelled, smooth, of a deep dull red, from one to five feet long. *Scapes* in the single plant now before me, four issue from the axill of one leaf, they are more or less erect, round, coloured, smooth, somewhat clavate, from three to four inches long. *Spathe* coloured, lanceolate on both sides, opening a little above the middle; at all times closely shut except for a short



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space, and just before the pollen is discharged. *Spadix* scarcely longer than the spathe, sub-cylindric; the lower third covered with the germs, intermixed with small, white, clavate, stamen-like scales; the upper two thirds closely covered with sessile twin anthers. *Germs* round, three-celled, with the rudiments of many ovula in each. *Style* none. *Stigma* large, convex, obscurely three-lobed.

4. C. *oblongifolia. Roxb.*

Caulescent. *Leaves* erect, oblong. *Spathe* boat-shaped, acuminate, a few female below.

Arum aquaticum. *Rumph. Amb.* v. *t.* 108.

A native of the Moluccas, from thence brought to the Botanic garden at Calcutta, where it blossoms during the rains.

*Root* fibrous, perennial. *Stem* straight, in plants of four or five years' growth above a foot high, and an inch in diameter, marked with the cicatrices of the fallen leaves. *Leaves* terminal, erect, petioled, oblong or narrow cuneate-oblong, entire, smooth on both sides, from six to nine inches long, and about three broad. *Petioles* shorter than the leaves, the upper third nearly round. *Scapes* axillary, shorter than the petioles, round, smooth. *Spathe* oblong, boat-shaped, acute, pointed, smooth, of a deep green on both sides, gaping considerably. *Spadix* cylindric, rather shorter than the spathe, the lower third, or two fifths, with a few scattered pistils, the upper part closely covered with four-celled anthers. *Berry* globular, one-seeded.

5. C. *picta. R.*

Caulescent. *Leaves* short-petioled, ovate-oblong, entire, clouded. *Flowers* axillary, solitary, peduncled. *Spathe* gibbous, acuminate, shorter than the obtuse, clavate spadix.

A native of the Island of Sumatra; in the Botanic garden where it has been introduced, it blossoms about the close of the rains. In this the male part of the spadix is three or four times longer than the base or female part; anthers with two,

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two-lobed cells. The germs ovate, containing one ovulum only, attached to the bottom of the cell.

6. C. *virosa. R.*

Caulescent. *Leaves* peltate, ovate, slightly waved, undivided at the base. *Spadix* one fourth the length of the subulate spathe, with the female florets at the base. *Anthers* many-celled.

*Hind.* Bish Kuchoo, Bish means poison; this species we may therefore conclude is at least reckoned so.

A short, large, waved plant of an uncommon appearance, the leaves being only undulate round the base, and therefore nearly destitute of that division into two large lobes so common to the simple leaved plants of this order. Flowering time toward the close of the rains.

*Stem* in our young plants in the Botanic garden short, simple, round, and considerably bent to one side. *Leaves* petioled, peltate, ovate, undivided at the base; the posterior margin undulate, from one to two feet long, and from six to fifteen inches broad. *Petioles* about the length of the leaves, base sheathing, the rest round and smooth, and the colour nearly an uniform green. *Scapes* axillary, many together, somewhat angular, half the length of the petioles, one-flowered. *Spathe* subulate, nearly straight, convolute, smooth, of a lively yellow; about four times longer than the spadix. *Spadix* about three inches long, obtuse; the lower third part covered with the female florets, and the upper two thirds with the male. *Anthers* peltate, from eight to twelve-celled round the margin. *Germs* broad-ovate, one-celled, containing many ovula attached to three or four parietal receptacles. *Style* scarcely any. *Stigma* large, peltate.

## *GNETUM. Schreb. gen. N.* 1477.

MALE. *Calyx* a cylindric ament with rotate, entire, many-flowered scales. *Perianth proper* or *corol* tubular, contain-

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ing a single filament with a two-lobed anther. FEMALES above the males in the same scale of the ament. *Perianth proper* or *corol* urceolate. *Germ* superior, one-celled, ovula solitary, superior. *Style* short. *Stigma* trifid. *Drupe* one-seeded. *Embryo* inverse, with an ample perisperm.

1. G. *gnemon. Willd.* iv. 591.

*Leaves* opposite, elliptic; *aments* axillary, compound.

Gnemon domestica. *Rumph. Amb.* i. *t.* 71.

A native of Sumatra, and the Molucca Islands. Strong cords are made of the fibres of its bark, at Sumatra, and its leaves are used as spinage. In both male and female, the corol is very distinct, and of a pitcher shape, with a small perforation at top, they are separately surrounded with a number of slender, short filaments, which may be called perianths.

2. G. *scandens. R.*

Shrubby, scandent. *Leaves* opposite, oblong.

Ula. *Rheed. Mal.* vii. *p.* 41. *t.* 22.

Gnemon funicularis. *Rumph. Amb.* v. *p.* 12. *t.* 7, and 8.

Nanu-witi, the vernacular name in the Silhet district. A stout scandent shrub, a native of the hilly parts of Chittagong, and the eastern parts of Bengal, as well of Malabar and the Moluccas. Flowering time in the former, March and April, fruit edible, ripening in September and October.

*Young shoots* round, smooth, jointed at the insertion of the leaves and there swelled. *Leaves* opposite, short-petioled, oblong, firm, glossy, entire, rather obtuse, about six inches long, by three broad. *Petioles* rather short, enlarged at the base on the inside. *Stipules* none. *Peduncles* axillary and terminal, generally one or two opposite pairs of peduncled cylindric aments and a terminal one; all are round and smooth. *Scales* of the aments short, cyathiform, forming a complete ring around the rachis at every eighth part of an inch, embracing a double whorl of male and a single whorl of female florets, over them; the whole intermixed with much

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brown hair. MALE FLORETS: *Perianth proper* or *corol* unequally ovate, with a minute perforation at the apex for the style and stigma to pass through. *Filaments* single, from the bottom of the tube of the perianth, ovate with a minute perforation at the apex for the style and stigma to pass through. *Germ* superior, hid in the perianth, lanceolate, one-celled. *Style* short. *Stigma* trifid. *Drupe* oblong, rather larger than the largest olive; when ripe smooth, and of a reddish orange colour, one-celled. *Pulp* intermixed with many tender spiculæ like those of Cowhage, yet said to be greedily eaten by the natives, where the plants grow. *Nut* conform to the drupe, rather tough, but thin and ribbed on the inside, and on the outside striated, one-celled, evalvular. *Seed* conform to the nut. *Integuments* two; the exterior one thin and fibrous; the inner one less distinct, and adhering to the perisperm very firmly. *Perisperm* conform to the seed, cartilaginous. *Embryo* in the apex of the perisperm, straight. *Cotyledons* two, ensiform, unequal. *Radicle* superior.

*CASUARINA. Schreb. gen. N.* 1395.

*Male calyx* an ament. *Corol* two-petalled, or two-parted. *Female calyx* an ament. *Corol* none. *Germ* one-celled, one-seeded; *attachment* inferior. *Style* two-cleft. *Strobile* two-valved, one-seeded. *Seeds* winged. *Embryo* inverse, with little or no perisperm.

C. *muricata. R.*

Dicœcous, arboreous. *Branches* and *branchlets* scattered, horizontal; *strobiles* oval, murexed with the unarmed, sharp, conical points of the little capsules.

A native of the sand hills, on the sea side, in the province of Chittagong; and from thence was sent by Dr. Buchanan to the Botanic garden, where in the course of ten years, from the seed, they have grown to be trees of from sixty to eighty feet in height; with trunks three feet and a half in circum-

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ferance four feet above ground, but in their native soil, the large trees are said to be nearly one hundred feet high, and nine or ten feet in circumference. The wood is not held in estimation, though of a reddish colour, and texture like *Cedrela Toona.* In the Botanic garden they blossom during the months of February and March.

*Trunk* straight up to the top of the trees, as in the Firs and Pines. *Bark* smooth, brown, and considerably cracked. *Branches* scattered, horizontal with apices ascending and the extreme twigs often drooping. *Leaves* or rather extreme filiform division of the branchlets verticelled, though frequently not more than one or two in the verticel, that is from the same annular stipule, slightly furrowed, simple, or ramous, jointed, with joints ending in a six to eight-cleft cup, in which the next joint sits. *Stipules*, for so I will call the six to eight-cleft, annular, woolly ring that surrounds the branchlets and embraces the insertion of the leaves, or small slender branchlets and the peduncles. MALE. *Aments* cylindric, terminating the leaves. *Scales* from six to eight in a verticel, and united at the base, they are pointed and woolly. *Flowers* as many as there are divisions in the verticel. *Corol*, two opposite, boat-shaped, ciliate scales opposite to each cleft of the verticel. *Filaments* single, twice as long as the verticel. *Anthers* two-lobed. FEMALE FLOWERS, on a different tree; at least trees now seventy feet high, that have been annually in flower these ten years have not produced any other, and issue solitarily with the leaves, from the six or eight-cleft, annular stipules. *Aments* oval, short-peduncled. *Scales* from six to eight, at the base united into a verticel, with a single flower between each. *Corol* none. *Germs* oblong; *style*, the entire part very short, soon dividing into two long, recurved, bright, garnet-coloured portions. *Stigmas* simple. *Strobiles* oval, about the size and shape of a nutmeg, armed with the sharp conic points of the two-valved capsules. *Seeds* small, with a large, wedge-shaped, membranaceous wing.

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*ARTOCARPUS. Schreb. gen. N.* 1393.

***Male*** and ***Female florets*** on the interior surface of different receptacles. ***Male proper perianth*** from two to three-leaved. ***Corollets*** none. ***Female proper perianth*** one-valved. ***Corollets*** none. ***Germ*** one-celled, one-seeded; ***attachment*** superior. ***Style*** single. ***Fruit*** compound. ***Embryo*** without perisperm.

1. A. ***hirsuta. Lamarck. Encycl.*** iii. 201.

***Leaves*** entire, ovate. ***Stipules*** hirsute. ***Male aments*** cylindric and pendulous. ***Female*** globular and erect.

***Artocarpus pubescens. Willd.*** iv. 198.

Ansjeli. ***Rheed. Mal.*** iii. *t.* 32.

Angelee is the name it is known by amongst the natives in the vicinity of Tellicherry.

A native of the forests of Malabar, where it is common and grows to be a tree of great magnitude, and its timber is used for various economical purposes. Mr. Dyer, the surgeon at Tellicherry, who sent me specimens in flower gathered in February, says it is chiefly hewn out to make fishing boats as mentioned by Van Rheede.

***Young shoots*** hirsute. ***Leaves*** alternate, petioled, oval, entire, obtuse, somewhat hairy underneath, particularly the large parallel veins, from six to seven inches long, and from four to five broad. ***Petioles*** short, hirsute. ***Stipules*** lanceolate, hairy on the outside. ***Aments*** in pairs, axillary or from the axills of the former year's leaves; ***male*** long, slender and pendulous; ***female*** round, longer-peduncled and erect. ***Bractes*** or chaffy scales linear, obtuse and mixed amongst the male florets. ***Male perianth*** one-leaved, sub-cylindric; ***mouth*** two-parted. ***Corol*** none. ***Filaments*** single, the length of the calyx. ***Anthers*** two-lobed. ***Female perianth*** one-valved; the lower third part of the whole length firmly united to each other, the other two thirds daggered; nearly solid, there being only a slender perforation through its centre for



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the style, armed on the outside with stout stiff bristles. *Corol* none. *Germ* ovate, one-celled, containing one ovulum attached to the top of the cell. *Style* longer than the calyx, filiform. *Stigma* simple, acute. *Fruit* compound, oval, of the size of a very large lemon, armed with numerous hispid spines, on the enlarged end are still more indurated points of what I called the perianth, (See above.) Internal parts and arrangement as in the common *Jak*, *Sitodium cauliflorum*, *Gært. sem.* i. 345. *t.* 71. and 72. *Seeds* many, ovate or oval, the size of a field bean. *Integuments* two, the exterior one, firm like parchment; the interior one thicker, dark brown, and spongy. *Perisperm* none. *Embryo* with two equal cotyledons, and minute body lodged close to the umbilicus at the smaller end of the seed.

2. A. *integrifolia. Willd.* iv. 184.
*Leaves* oblong, entire. *Flowers* cauline.
Sitodium *cauliflorum. Gært. Sem.* i. 345. *t.* 71, 72.
*Sans.* and *Teling.* Punusa.
Tsjaca marum. *Rheed. Mal.* iii. *t.* 26, 27, 28.
*Beng.* Kanthal.
Jak tree.
Polyphema *Jaca. Lourier. Cochin Ch.* 667.

It is much cultivated throughout Southern India, and all the warmer parts of Asia; where it is wild or originally from, I know not. On the coast of Coromandel, it does not in general attain to any great height, from thirty to forty feet may be reckoned a high tree, but with a very large, ramous, dense, shady head, particularly when it stands detached from other trees, and a short thick trunk, about twelve feet high; flowering time the cold season, fruit ripe in four or five months afterwards.

*Leaves* alternate, petioled, oval, in young luxuriant plants often lobed, of a firm leathery texture, above of a deep smooth shining green, below less so, about four inches long. *Petioles* short, slightly channelled. *Stipules* two, broad-lanceo-

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late, pretty smooth, embracing like a spathe the next inner leaf and ament when present, falling as soon as they begin to expand. MALE FLOWERS. *Ament* single, short-peduncled, the size of a man's thumb, or more; generally on small, recent branchlets which issue from the trunk and larger branches, every where most closely covered with the small sessile corollets. *Spathe* no other than the above mentioned stipules. *Perianth proper*, or *corol* two-leaved; *leaflets* wedge-formed, equal, a little hairy. *Stamens, filament* single, thick, club-shaped, rather larger than the perianth. *Anthers* two-lobed; *lobes* oval, and grooved in the middle. FEMALE FLOWERS on the same tree, and mixed with the male on the same branchlets. *Calyx; spathe*, no other than the male has, viz. the stipules. *Ament* oblong, closely covered with innumerable, small, sessile germs, perforated at the apex for the style to pass. *Germs* numerous, their exterior coverings uniting near the base; above they are from four to six-angled, and throughout solid, except where the germ proper and style is lodged. *Germ proper*, ovate, lodged in the bottom of the last described covering. *Style* single, rather longer than the envelope of the germ. *Stigma* single, recurved, clubbed, grooved on the outside. *Fruit* compound, oblong, murexed, from twelve to thirty inches long, from six to twelve in diameter, weighing from ten to sixty pounds. *Seeds* reniform, one in each germ, were all to come to maturity, which never can happen; they are about the size of a nutmeg, enveloped in a thin, smooth, leathery sheath, lodged within the fleshy eatable part of the fruit, which formed the exterior coverings of the germ, already noticed.

For a more particular account of the fruit, see *Gærtner on Seeds, vol.* i. *page* 344. 346. *tab.* 71. and 72. all that is intended by this description, is to give a tolerable idea of the parts of fructification.

The fruit of this tree is so universally known, that it is unnecessary for me to say any thing respecting its excellence, as well as that the seeds, when roasted, are not inferior to the



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best *chesnuts*. In Ceylon, where the tree grows most plentifully, and where the fruit attains to its greatest size, the inhabitants make them a very considerable article of their diet.

The wood comes near to mahogany in appearance, and is much used for making furniture, in Ceylon and some other parts of India.

The Indians of those parts prepare their best bird-lime from the tenaceous white juice, wich abounds in all the uneatable parts of the fruit, and in the young tender parts of the tree. It flows freely from recent wounds.

3. A. *Lakoocha. Roxb.*

*Leaves* entire, oval. *Aments* axillary, globular. *Fruit* nearly round, somewhat lobate, and almost smooth.

*Sans.* Lukoocha.

*Beng.* Dhea-phul-Burhul.

Found in the gardens in the vicinity of Calcutta, and is common all over Bengal. *Leaves* deciduous during the cold season, appearing again with the flowers in March about the beginning of the hot season.

It is so far as I have seen, a tree of a middling size, with a short but thick trunk, and a very large spreading head.

*Bark* of the trunk very rough; that of the young parts pretty smooth. *Leaves* about the extremities of the branchlets alternate, short-petioled, somewhat bifarious, oval, entire, generally pointed, smooth above, downy beneath, with many parallel veins, and beautifully reticulated between them, from four to twelve inches long, and from two to six broad. *Stipules* small, cordate, caducous. *Aments* axillary, being from the axills, or most exterior germs, of last year's leaves; the male are below, the female on the same branchlets, but from different axills. MALE FLOWERS. *Calyx; spathe* no other than one, or two, small, stipule-like scales, embracing the insertion of the spadix. *Aments* sub-sessile, irregularly roundish, about the size of a nutmeg, every where covered with innumerable florets, internally of a beautiful rose-colour. *Peri-*

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*anth proper*, or *corol*, consisting of small, wedge-shaped, truncated scales. I find it difficult to assign any determined number to each stamen, from two to four is most common. *Filaments* rather longer than the scales of the calyx, tapering from the base. *Anthers* round, minute, elevated a very little above the surface of the spadix. FEMALE FLOWERS. *Calyx; spathe* as in the male. *Ament* short-peduncled, globular. *Perianth proper*, as in A. *integrifolia*. *Germs* numerous, of the shape of a Florence flask; *style* the length of the exterior coat of the germ. *Stigmas* subulate. *Fruit* compound, the surface pretty smooth; the internal structure as in the genus, about the size of a man's fist or larger, and generally of an irregular, roundish form, when ripe yellow. *Seeds* oblong, involved in the same number of integuments as in A. *integrifolia*.

The natives eat the fruit; to an European the taste will generally be found disagreeable. The male spadix is acid, and astringent; the natives eat them in their curries. The roots dye yellow. The whole tree and unripe fruit, like A. *incisus*, and *integrifolia*, contain much tenaceous milky juice.

4. A. *Chaplasha. Roxb.*

*Leaves* in the adult, obovate, entire; in the young pinnatifid. *Aments* axillary, long-peduncled, sub-rotund. *Fruit* spherical.

*Beng.* Chaplash.

A native of the eastern frontier of the Province of Bengal, about Tipperah, and Chittagong, where it grows to be a tree of the first magnitude. Flowering time March and April, when the first flowers appear, the tree is destitute of leaves, but they make their appearance before the fruit is formed.

*Trunk* straight; *branches* numerous, ascending. *Bark* tolerably smooth, of a dark brownish olive colour. *Leaves* alternate on short, round, pubescent petioles; in young plants frequently, indeed generally, pinnatifid; in grown trees oval or obovate, cuneate, with the margins somewhat remotely

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dentate-serrate, or scolloped, of a thick, firm, harsh texture; from six to twelve inches long, and from four to eight broad. *Stipules* two, spathiform, within the leaves, opposite, caducous. *Aments*, the first that appear are immediately below the germs, which contain the new swelling foliage; afterwards when the leaves begin to expand they are axillary, both male and female are long-peduncled, and nearly round. MALE FLOWERS. *Calyx*, *ament* long-peduncled, sub-rotund, of the size of a nutmeg, covered with innumerable, very minute florets, intermixed with slender, peltate bractes, or scales. *Perianth* proper; *scales* two, rarely three, wedge-shaped, with their apices somewhat rugged. *Corol* none. *Filaments* one or two, rather longer than the corol. *Anthers* twin. FEMALE AMENTS amongst the male. *Calyx; ament* long-peduncled, spherical, entirely covered with innumerable florets, intermixed with small peltate scales, as in the male. *Perianth proper*, one-leaved, clavate, fleshy, with a small perforation for the style to pass through. *Corol* none. *Stamina* none. *Germ* ovate. *Style* slender. *Stigma* curved, and just projecting without the apex of the perianth. *Fruit* compound, perfectly round, drooping on its long peduncle, about the size of a very large orange, and much like the bread fruit, *Artocarpus incisa*, only much smaller. *Seeds* numerous, oblong, white, and about the size of *Pistachio nuts*.

It differs widely in many respects from *Artocarpus Lakoocha*. First, chiefly in the appearance of the trees; for this is tall and straight, growing to an immense size, of which canoes are made on the Fennee and Gomootee rivers. The wood is also serviceable for various other purposes, and is reckoned superior to almost every other sort, particularly when employed under water; that being short, very ramous, and generally crooked. Secondly, here both male and female aments, and consequently the fruit, are long-peduncled; there very short. Thirdly, here the fruit is spherical; there of an irregular, lobate shape.

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5. A. *echinata. Roxb.*

*Leaves* oblong, entire. *Male* and *female aments* round. *Fruit* spherical, echinated.

Tampoine of the Malays of Malacca.

A native of Prince of Wales' Island, and other parts east of the Bay of Bengal, where it grows to be a moderate sized tree, and the fruit is eaten by the natives.

*Trunk* in a young tree in the Botanic garden at Calcutta, short, stout, and straight. *Branches* numerous in every direction, forming a dense, sub-globular head. *Bark* of the old woody parts of a dark olive green, that of the young shoots harsh with short stiff appressed brownish hairs. *Leaves* alternate, short-petioled, oblong, entire, obtuse, hard, with the upper surface glossy, and the lower one lighter coloured and harsh, from six to eight inches long, and from three to six broad. *Stipules* lanceolate, concave, harsh with short, appressed hairs. *Male aments* axillary, short-peduncled, globular, of the size of a gooseberry, yellow. *Bractes*, a few, clavate-peltate, intermixed with the corollets. *Calyx* one-leaved, bifid segments oblong, obtuse. *Filaments* single, rather longer than the calyx. *Anthers* sub-rotund. *Female aments* terminal, longer peduncled, globular. *Fruit* compound, round, of the size of a small shaddock, armed with numerous, long, straight, subulate spines as in A. *hirsuta*, (*Ansjeli. Rheed. Mal.* iii. *t.* 32.) *Seeds* numerous, and oval, as in the genus.

6. A. *lanceæfolia. R.*

*Leaves* broad-lanceolar, or oblong, acuminate, entire. *Fruit* terminal, spherical.

A native of Prince of Wales' Island.

7. A. *incisa. Willd.* iv. 188.

*Leaves* gashed and pinnatifid. *Male aments* cylindric. *Fruit* terminal, round.

Bread-Fruit of Dampier, Anson, Cook, and Ellis.

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Soccus lanosus, granosus and sylvestris. *Rumph. Amb.* i. *t.* 32, 33, and 34.

A native of the Moluccas, and South Sea Islands. It has been long introduced into Bengal, but the winters there are much two cold for it, and during that period it looses nearly as much as it gains the rest of the year.

*FICUS. Schreb. gen. N.* 1613.

*Male* and *female corollets* on the interior surface of the common receptacle. *Proper perianth* various in both. *Corollets* none. *Seeds* solitary.

*Note.* I have examined minutely the florets of nearly the whole of the following species, and found only two instances in which they were not androgynous; and by far the greater part monandrous.

SECT. I. *Fruit solitary or paired.*

1. F. *Carica. Willd.* iv. 1131.

*Leaves* angular, lobate, or palmate, three-nerved, scabrous above, downy underneath. *Fruit* solitary, turbinate, smooth.

*Pers.* Unjeer.

*Arab.* Seen.

*Beng.* Doomar or Doombur.

Found in a cultivated state, in India, Persia, and Arabia. The leaf is much less divided than in the trees from England, or than I ever observed them in Europe.

2. F. *hirsuta. Roxb.*

Arboreous. *Tender parts* hirsute. *Leaves* round-cordate, from three to five-lobed, serrate-dentate; *lobes* acute. *Fruit* axillary, paired, sessile, oval, shaggy.

Dungra, the vernacular name in the Silhet district, where the tree is indigenous, and produces fruit during the dry season.

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*Young shoots* sub-succulent, and very hairy; *hairs* fulvous. *Leaves* alternate, petioled, round-cordate, from three to five-lobed, serrate-dentate, hairy, particularly the nerves underneath; *lobes* acuminate; length and breadth from six to ten inches. *Stipules* lanceolate. *Fruit (receptacle,)* in pairs, axillary, sessile, round, an inch and a half in diameter, very hairy, of a rich yellow, fleshy; *flesh* firm and yellow. *Umbilicus* scaly and scarcely elevated above the surface of the fruit. *Calyx* of the fruit; *leaflets* three, obliquely round, cordate, cuspidate, sericeous on the outside. *Male corollets* a few, just within the umbilicus, sub-sessile. *Calyx* three-leaved, or deeply three-parted; *leaflets* oblong, deep red. *Filaments* generally two, short. *Anther* linear-oblong. *Female corollets* numerous, long-peduncled, occupying the whole of the cavity of the receptacle. *Calyx* as in the male. *Germ* sub-globular. *Style* on one side, short. *Stigma* large, somewhat three-lobed.

The fruit is eaten by the natives of Silhet, where the tree is indigenous.

3. F. *palmata. R.*

*Leaves* palmate, woolly underneath; *lobes* serrulate dentate, and cuspidate.

Found by Dr. W. Hunter indigenous at Pulo Pinang.

4. F. *caricoides. Roxb.*

Sub-arboreous. *Leaves* cordate, crenate, villous. *Fruit* axillary, solitary, or paired, peduncled, trigonal-turbinate, wrinkled. *Umbilicus* shut with three cordate scales. *Calyx* from five to six-leaved.

From General Martin at Lucknow, some plants were received into the Botanic garden where they grow readily from cuttings, thrive well, and bear fruit abundantly.

*Stem* erect. *Branches* ascending, having much the appearance of those of the common fig, only running more into long slender twigs. *Leaves* alternate, petioled, cordate, cre-



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nulate, villous; from six to ten inches long. *Petioles* round, downy, two or three inches long. *Fruit* axillary, long-peduncled, solitary, erect, of a triangular-turbinate shape, with a round, closed, prominent umbilicus; wrinkled on the outside, and somewhat villous; when ripe yellowish, and about the size of a gooseberry. *Calyx* of the fruit three-leaved, that of the corollets five-leaved, as in the genus.

*Note.* The plant has so much the general habit of F. *Carica*, that I long considered it an accidental variety, but as the tree is less like it when old, and the shape of the leaves continues constant, I am now induced to consider it a distinct species. The fruit is tough, and very unpalatable, in short not eatable.

5. F. *virgata. R.*

Shrubby. *Leaves* broad-cordate, obtuse, serrate-crenate, three-nerved, downy. *Fruit* axillary and lateral, peduncled, solitary, oval, smooth.

A native of Rohilcund; flowering time the dry season.

*Trunk* tolerably erect. *Branches* few, weak, ascending, covered with smooth, brownish, ash-coloured bark; the whole height of plants six years old, from four to eight feet. *Leaves* alternate, petioled, broad-cordate, three-nerved, obtuse, serrate-crenate, very downy underneath; from three to four inches long, by three broad. *Petioles* round, downy, about two inches long. *Stipules* semi-lanceolate, caducous. *Fruit* axillary, solitary, ovate, of the size of a pea, yellow, pretty smooth, supported on round, downy peduncles, rather less than an inch long. *Calyx, common*, three-leaved, and removed a little from the fruit, by a short pedicel. MALE. *Corol* round the inside of the mouth of the fruit, long-pedicelled. *Calyx* of from three to five, lanceolate, hairy leaflets. *Stamina* three. *Female corollets* numerous, sub-sessile. *Calyx* generally three-leaved. *Germ* round. *Style* hairy, tapering to a fine, hairy, coloured stigma.

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6. F. *hirta. R.*

Arboreous. *Tender parts* very hairy. *Leaves* long-petioled, cordate, ciliate, serrate. *Fruit* axillary, paired, sessile, ovate, shaggy.

Bun or Khura Doomoor, of the natives of Silhet, where the tree is indigenous, and grows to a great size, and is beautiful during the dry season.

*Young shoots* rather succulent, and very hairy; *hair* fulvous. *Leaves* alternate, long-petioled, cordate, acutely serrate, from three to five-nerved, sometimes somewhat angular, or obscurely lobed; the upper surface a little hairy, very downy underneath, particularly the nerves, a foot long, by nine or ten inches broad. *Petioles* very shaggy, round, from six to eight inches long. *Stipules* lanceolate, sericeous. *Fruit* axillary, sessile, ovate, hirsute, of the size of a pigeon's egg, one or two calycine-like cuspidate scales near the base. *Calyx* three-leaved; *leaflets* obliquely cordate, acuminate. *Male corollets* a few round the mouth of the receptacle, diandrous, with a red, five-cleft calyx. *Female corollets* numerous, over the whole of the inside of the receptacle, long-pedicelled. *Calyx* three-leaved, or three-parted; *parts* lanceolate, and coloured as in the male. *Germ* oval. *Style* the length of the germ. *Stigma* bifid.

7. F. *squamosa. R.*

Shrubby. *Leaves* alternate, short-petioled, turbinate, very scabrous; *stipules* permanent. *Fruit* solitary, or in pairs, short-peduncled, turbinate, very scabrous, some large scales about the apex.

Found by Mr. Gott indigenous in Rohilcund.

8. F. *laminosa. Hardw.*

Shrubby, spreading. *Leaves* opposite, broad-lanceolate, scabrous. *Fruit* globular, ribbed, and imbricated with lamina.

Chan cheree of the inhabitants of the mountains near Chin-



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nalee, where Colonel Hardwicke found it growing in moist situations, and spreading over the rocks. See *Asiat. Res.* vi. *p.* 379.

9. F. *heterophylla.*

Shrubby, sub-scandent. *Leaves* variously divided, scabrous. *Fruit* axillary, paired, peduncled, rough.

Valli teregam. *Rheed. Mal.* iii. *t.* 62.

*Beng.* Ghoti-suara.

*Teling.* Buroni.

A weak, straggling, shrubby species, a native of thickets, &c. on the banks of rivers, and water courses, where its roots are constantly moist.

*Stems* long, woody, weak, supporting themselves amongst bushes. *Bark* scabrous, rust-coloured. *Leaves* alternate, short-petioled, oval or oblong, sometimes entire, but more frequently divided into almost every form that can be imagined, very scabrous, with the divisions often toothed. *Fruit* axillary, paired, peduncled, round-turbinate, of the size of a large gooseberry, when ripe yellow, with whitish, scabrous spots. *Calyx* of the fruit minute, three-parted.

The bark of the root is very bitter, it is given by the Hindoos of these parts to remove pains in the bowels.

This is truly a polymorphous plant, and I suspect Vahl's *Ficus denticulata, truncata,* and *serrata,* as well as Willdenow's *aquatica,* and probably Louriero's *cannabina,* are nothing more than varieties of this species; at least I have never met with any other that can be compared with them, and this varies so much, even on the same plant, as to agree with them all.

10. F. *scabrella. R.*

Shrubby, scandent. *Leaves* alternate, short-petioled, oblong, remotely serrulate-dentate, scabrous. *Fruit* axillary, solitary, peduncled, turbinate, tubercled, of the size of an olive, scales of the umbilicus ciliate.

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Bullum Doomoor, the vernacular name in Chittagong, where it is indigenous, and the fruit eaten by the natives in their curries. It is an extensive rambling species, depending on other plants for support, but does not root on them, as some nearly allied species do.

*Leaves* alternate, short-petioled, oblong, remotely serrate, or a compound of that and scollop-dentate, very harsh to the feel, from two to five inches long, and from one to two broad. *Fruit* axillary, peduncled; two is the habit, but rarely more than one grows to half the full size, which is that of a large olive, turbinate, rough with spongy, brownish tubercles, or knobs; when ripe the ground colour is yellow. *Umbilicus* clavate and shut with ciliate scales. *Calyx* of the fruit rather remote from it, and three-lobed. *Male corollets*, a few round the mouth of the umbilicus, monandrous, with from three to four-cleft perianths. *Female corollets* numerous over the whole of the smooth inside of the receptacle, with a perianth like that of the male.

11. F. *fructicosa. R.*

Shrubby. *Leaves* petioled, sub-ovate, entire, void of pubescence, but harsh. *Fruit* in axillary pairs, rather long peduncled, round.

Parkut Doomoor, the vernacular name in Chittagong, where it is indigenous, and grows to the size of a bushy, spreading shrub of about five or six feet in height, but shows no tendency to climb, or ramble, like some other nearly allied species, natives of the same country and the adjoining provinces.

*Young shoots* void of pubescence, but harsh with minute points, scarcely visible to the naked eye. *Leaves* short-petioled, alternate, ovate, rather obtuse, entire, and like the young shoots somewhat harsh to the feel; from three to four inches long, by from one and a half to two and a half broad. *Fruit* in axillary pairs, rather long peduncled, round, pretty smooth, the size of a small cherry, of a deep orange. *Umbilicus* flat and shut with a few, smooth scales. *Calyx* of the

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fruit rather remote, small and three-lobed. *Male corollets* many and mixed among the female, diandrous, with a three-parted red perianth. *Female corollets* with the perianth like the male, the stigma two-toothed.

12. F. *Luducca. Roxb.*

Shrubby, very ramous. *Leaves* short-petioled, ovate, acute, entire, firm. *Fruit* axillary, solitary, short-peduncled, round, hairy.

Luduka, and Debree of the natives of Dosa, where Colonel Hardwicke found it on his journey to Shreenagur.

13. F. *Chincha. R.*

Shrubby. *Leaves* petioled, oblong, obtusely cuspidate, entire, scabrous. *Fruit* axillary, sub-sessile, round, scabrous, with an elevated umbilicus.

Chincha of the natives about Dosa, where it was found by Colonel Hardwicke on his journey to Shreenagur.

14. F. *quercifolia. Roxb.*

Perennial, creeping, *Leaves* reflected, oblong, irregularly sinuate, scabrous underneath. *Fruit* solitary, peduncled, short-oval, of the size of a pea.

A native of the Island of Sumatra, and sent to the Botanic garden by Dr. Charles Campbell, from Bencoolen. It bears fruit all the year.

*Stems* none. *Branches* creeping to an extent of about two feet, round and pretty smooth. *Leaves* alternate, petioled, reflected, oblong, deeply, and irregularly sinuate, scabrous, particularly underneath, from one to three inches long, and about half that in breadth. *Petioles* short, somewhat channelled. *Stipules* tapering, coloured, caducous. *Fruit* axillary, solitary, peduncled, short-oval, warty, the size of a pea. *Umbilicus* elevated, large, coloured, and nearly shut with scales. *Perianth* no other than two, or three, remote small scales on the peduncle and fruit. *Corollets* many; the *female*

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ones below, a few diandrous; the *hermaphrodite* ones just within the umbilicus. *Perianth* in both five-cleft.

15. F. *humile. Roxb.*

Perennial, creeping. *Leaves* short-petioled, oblong, remotely dentate-serrate, harsh, obtusely acuminate. *Fruit* paired, peduncled, oblong with an elevated umbilicus.

From Sumatra, where it is indigenous, this small cespitose species has been introduced into the Botanic garden where it produces fruit the whole year. It is like F. *quercifolia* in habit, and I at first considered it to be only a variety of that species; but a longer and more intimate acquaintance with both, induces me to think them distinct. In this I have found only female florets.

*Stems* and *branches* spreading flat on the ground, and striking root, round and pretty smooth, the most tender luxuriant shoots somewhat three-sided. *Leaves* alternate, short-petioled, shape between oblong-ventricose and rhomboidal; *apex* alternate, but obtuse, margin remotely serrate-dentate; both surfaces void of pubescence, but harsh, from two to four inches long. *Petioles* and *veins* red. *Stipules* ensiform, coloured, smooth. *Fruit* axillary, paired, peduncled, of the size of a pea, oblong, with a large elevated umbilicus. *Corollets* entirely female in all the plants brought to this garden. *Calyx* five-parted; *segments* ensiform.

16. F. *repens. Willd.* iv. 1149.

Somewhat shrubby, creeping. *Leaves* obliquely cordate, lobate, serrate-dentate. *Fruit* solitary, peduncled, long-obovate.

*Beng.* Bhooi-Doomoor.

A native of pasture ground, and borders of tanks about Calcutta.

*Stems* creeping or diffuse, close on the ground, ramous, as thick as a quill; *young shoots* a little hairy. *Leaves* alternate, petioled, unequally cordate, often deeply sinuate, gene-

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rally acutely and regularly serrate, the upper surface scabrous, underneath downy; size very various. *Petioles* about half the length of the leaves. *Stipules* opposite, and not dropping so soon as in the other species I have met with. *Fruit* axillary, solitary, peduncled, obovate, somewhat scabrous, scarcely the size of the point of the little finger. *Peduncle* bracted at the middle, or it may be called a three-leaved calyx, and then the fruit is pedicelled.

17. F. *radicans. R.*

Shrubby, scandent, and rooting. *Leaves* oblong, entire, long-linear, acuminate. *Fruit* globular, without a common calyx, long-peduncled. *Male corollets* monandrous.

Poora *rooha* the vernacular name in Silhet, where it is indigenous; it grows to be of a considerable extent, rooting upon old walls, various kinds of bushes and trees, like the ivy in Europe and the parasites in India, but has its main root generally though not always on the ground. In fruit the whole year.

*Young shoots* a little harsh to the feel, and green. *Leaves* alternate, petioled, oblong, entire, three-nerved; *apex* long, and very narrow, or ensiform like that of F. *religiosa*, hard and rather rough with reticulate veins underneath; lateral nerves small, springing from the base and running close to the margin; from three to six inches long, and from one to three broad. *Stipules* as in the genus, but small. *Fruit* paired or single from the base of the little branchlets, all axillary, long-peduncled, round, of the size of a black currant, when ripe, yellow or orange. *Calyx* of the receptacle none. *Proper perianth* in both male and female five-cleft; *segments* ensiform. *Male corollets* monandrous, a few round the inside of the mouth of the receptacle, all the rest female.

18. F. *scandens. R.*

Shrubby, scandent. *Leaves* short-petioled, ovate, entire, fruit in axillary pairs, round, peduncled; *common calyx* three-toothed.

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A native of Silhet, where it grows to be a ramous climbing shrub, running up and over small trees, shrubs, &c.

*Bark* of the tender branchlets rather rough, and brown. *Leaves* very exactly ovate, short-petioled, entire, three-nerved, void of pubescence, but harsh to the feel, and very hard; from two to four inches long, and from one and a half to two and a half broad. *Fruit* in axillary pairs, all from the base of the small lateral branchlets, rather long-peduncled, round, rough, of the size of a black currant, and olive yellow when ripe. *Calyx* of the receptacle three-toothed. *Proper perianth* from three to five-parted in both male and female. *Male corollets* very few in some of the receptacles, in others none could be seen, monandrous.

19. F. *vagans. R.*

Shrubby, scandent, rooting to other trees. *Leaves* long-petioled, exactly cordate, villous underneath. *Fruit* axillary, peduncles solitary or in pairs, sub-globular, the size of a nutmeg; within hirsute.

A stout, woody, rambling species; a native of Chittagong, rooting on trees for support. It produces fruit at various periods through the year.

*Young shoots* smooth, except for a short while when they first appear, then a little hairy. *Leaves* alternate, long-petioled, exactly cordate, a little hairy underneath, of a hard texture, and rather harsh to the feel, entire, obtusely acuminate; about five inches long, by four broad. *Stipules* interfoliaceous, as in the genus. *Fruit* axillary, paired, is the habit, though one of the two is often wanting, long-peduncled, nearly round, about the size of a medlar. *Involucre* or *calyx* of the fruit three-lobed, and embracing its base. *Female corollets* only found, long-pedicelled, and intermixed with the long, stiff, tawny hairs, which line the inside of the fruit, or receptacle. *Calyx* from four to five-leaved; *leaflets* lanceolate, acuminate. *Style* clavate. *Stigma* perforated.



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20. F. *acuminata. R.*

Shrubby, scandent. *Leaves* short-petioled, lanceolar, entire, smooth, the apex long and ensiform. *Fruit* in axillary pairs, sub-sessile.

A native of Chittagong, where it runs over other trees, and emits roots, as it runs.

21. F. *hederacea. Roxb.*

Shrubby, scandent, rooting. *Leaves* ovate, smooth, but hard, fruit axillary, one or two, sub-sessile, round, the size of a cherry, and scarlet coloured.

*Luta-Parkut Doomoor*, the vernacular name in Chittagong, where it is indigenous in the forests, running up and over trees; and like the ivy emitting numerous small roots by which its very extensive ramifications are supported.

*Bark* of the woody parts dark brown, and rough; that of the *young shoots* harsh to the feel, but void of pubescence. *Leaves* alternate, short-petioled, ovate, entire, rather obtuse, smooth above, but rather rough underneath, and of a very hard texture; from three to five inches long, and two or three broad. *Fruit* in axillary pairs, though one of the two generally drops early, short-peduncled, round, the size of a large black currant, somewhat hispid, of a red orange approaching to scarlet. *Umbilicus* rather elevated, and shut with large, smooth scales. *Calyx* of the fruit appressed, and three-leaved; *leaflets* reniform. *Male corollets* sessile, and mixed among the female ones over the whole interior surface of the receptacle. *Perianth* three-leaved; *stamina* single. *Female corollets* pedicelled, with a three-parted perianth, and two-lobed stigma.

22. F. *Goolereea. R.*

*Leaves* opposite, obovate, serrate, downy. *Fruit* in axillary pairs, long-peduncled, nearly round, downy, with an elevated, scaly margin round the umbilicus.

*Hind.* Kuth-Goolureea.

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23. F. *Wassa. R.*

Shrubby, straight. *Leaves* broad-lanceolate, often laciniate, sub-serrate, scabrous. *Fruit* axillary, peduncled, solitary, or paired, sub-rotund.

Wassa of the Malays, and probably *Caprificus aspera. Rumph. Amb.* iii. *t.* 94.

This small straight species was introduced into this garden, from the Moluccas, by Mr. Smith. The fruit appears during the hot season.

*Stem* straight, almost simple, from three to four feet high, covered with dark brown, pretty smooth bark. *Leaves* alternate, petioled, broad-lanceolate, frequently much and variously lanceolate and in that case broader than when entire, with the margins often serrulate, rough on both sides, and having two small lateral nerves near the base, with a green gland in the axill of each, from two to six inches long. *Petioles* about an inch long, slightly channelled. *Stipules* chaffy, sub-lanceolate, caducous. *Fruit* axillary, solitary or paired, peduncled, somewhat compressed into the shape of a turnip, smooth, the size of a gooseberry; *umbilicus* small and shut with scales. *Calyx* of the fruit none; of the peduncle or bractes obscure. *Florets*, nine tenths are female, the few male ones are round the umbilicus and mixed amongst the inner scales thereof.

24. F. *Indica. Amoen. Acad.* i. *p.* 27. Martyn's *ed. Mill. Dict. N.* 9.

*Branches* dropping roots, which become as long as the original trunk. *Leaves* ovate-cordate. *Fruit* in sessile, axillary pairs.

*Sans.* Vuta. See *Asiat. Res.* iv. 310.

Peralu. *Rheed. Mal.* i. *t.* 28.

*Beng.* Bur, or But.

Varinga latifolia. *Rumph. Amb.* iii. 127. *t.* 84. the figure very bad.

*Cing.* Bagha.



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*Teling.* Marie.

Banyan tree.

An account of this immense, and most beautiful tree, is to be met with in almost every history of India.

It grows wild about the skirts of the Circar mountains, but in greatest perfection about, and in villages, where it is planted for the sake of its extensively cool, grateful shade; it is there the tree is found in its greatest perfection and beauty. Flowering time the hot season. I know of no other species of *Ficus*, which sends forth fibres from the branches, that descend to the ground, and become trunks.

. *Trunk;* when young it is distinct, and single, at all times its form, thickness, and height very variable; still more so than that of F. *religiosa*, because generally reared from branches procured naked, and stuck in the ground. *Branches* spreading to a great extent, dropping capillary roots here and there, these enter the ground, as soon as they reach it, gradually becoming as large as, and similar to the parent trunk, by which means the extent becomes almost incredible, the height of the tree is at the same time slowly increasing, some I have seen fully five hundred yards in circumference round the extremities of the branches, and about one hundred feet high, the principal trunk of which might be more than twenty-five feet to the branches, and eight or nine in diameter, they are largest about the villages situate in fertile valleys amongst the mountains. The bark is smooth and of a light ash-colour. The wood light, white and porous. *Leaves* alternate, about the extremities of the branchlets, petioled, ovate-cordate, three-nerved, entire; sometimes the border is very slightly waved, when young very downy on both sides, when old, less so, particularly above; from five to six inches long, and from three to four broad, at the apex of the petiole on the under side, is a broad, smooth, greasy looking gland. *Petioles* a little compressed, from one to two inches long, downy. *Stipules* within the leaves, sheathing, downy, falling, leaving their annular marks on the branchlets. *Fruit*

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paired, axillary, sessile, when ripe the size and colour of a middle sized, red cherry, downy. *Calyx* of the fruit three-nerved.

*Note.* Fig. 1. of Plukenet's 178th Table is a much better figure of this tree than Fig. 4. of the same table.

The Bramins are partial to the leaves of this tree to make their plates to eat off; they are jointed together by inkles.

Bird-lime is prepared from the tenacious milky juice which every part of the tree yields in abundance on being wounded.

Birds eat the fruit, and the seeds grow the better for having passed through them; if they drop in the alæ of the leaves of the Palmyra tree, *(Borassus flabelliformis)* they grow and extend their descending parts so as in time to embrace entirely the parent Palmyra, except its upper parts. In very old ones the top thereof is just seen issuing from the trunk of the Banyan as if it grew from thence, whereas it runs down through its centre and has its roots in the ground, the Palm being the oldest. For such the Hindoos entertain a religious veneration, saying it is a holy marriage instituted by Providence.

25. F. *elastica. Roxb.*

*Leaves* from oval to oblong, pointed, thick, firm and glossy. *Fruit* in axillary pairs, sessile, oval, smooth, the size of an olive. *Stipules* nearly as long as the leaves, smooth and rosy.

Kasmeer, the vernacular name by which this tree is known to the inhabitants of the Pundua, and Juntipoor mountains, which bound the province of Silhet on the north, where it is indigenous, and grows to the size of a full grown mango tree; that is fully as large as the great Maple, or Sycamore that grows in England. The season at which the young fruit appears, or at least when I procured it, was May and June; and they were ripe in August and September. Every part abounds with rich milky juice, which furnishes about one third of its weight of Caoutchouc.

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*Trunk* erect, from five to six or more feet in circumference, and high in proportion. *Bark* as in most of the genus tolerably smooth, of a light ash-colour. The wood as in far the greatest number of our East Indian *Fici*, rather soft, porous, of a light brown colour, and appears to be fit for fuel, or charcoal only. *Branches* numerous, spreading and rising in every direction, forming a very extensive, and shady head; the bark of the largest ones is like that of the trunk, that of the young shoots smooth, polished, of a deep green.

The *Juntipoor* Raja who procured plants of this tree and branches in young fruit, says the tree from whence the latter were taken is only four years old and is twenty-five feet high, with a trunk three feet in circumference.

From the larger branches roots descend as in many of the Indian *Fici*.

*Leaves* permanent, alternate, petioled, from oval to oblong, perfectly entire, acute, smooth, and highly polished on both sides, with the upper surface deep clear green, and the under one paler, from four to twelve inches long, and from three to five broad, with numerous, fine, diverging veins, as in *Callophyllum inophyllum*. *Rib* smooth and deeply tinged with red. *Petioles* about an inch long, round and perfectly smooth. *Stipules* solitary, sheathing, before they burst sub-cylindric, and tapering to a fine point, every part smooth, on the outside of a deep rosy colour; within paler, they drop off at an early period, leaving a permanent annular mark behind, and are from four to eight inches long; I have not met with any other species with such a beautiful foliage, and stipule as in this. *Fruit* or *receptacle* in axillary pairs, sessile, just when they are relieved from the stipules each of them is inclosed in a double integument or involucre, which by the growth of the fruit soon bursts and disappears, leaving annular marks round the base of the fruit. When ripe oval and about the size of an olive, smooth, and of a greenish yellow colour. *Male* and *female corollets* intimately mixed over the whole of the inner surface of the fruit or receptacle. *Male calyx* three-parted;

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*segments* lanceolate. *Filaments* single and short. *Anthers* erect, clavate, obtuse. *Female calyx* as in the male. *Germ* unequally-oblong. *Style* from one side near the apex, curved. *Stigma* rather large, and ragged.

A similar substance to that which the milk of this noble tree furnishes in such abundance, so pliable, so elastic, and so capable of resisting menstrua, has been already described by me in the 5th volume of the *Asiatick Researches*. I there observed that inferior sorts were furnished by the milky juices of the Jak tree, *Artocarpus integrifolia*, the Banyan tree, *Ficus Indica*, and the Pippula tree, *Ficus religiosa*; since that time some other plants have been discovered in the countries immediately to the eastward of Bengal, such as a new species of *Willughbeia*, there called *Luti Am* or the scandent mango, another, a new and beautiful *Melodinus* or climbing apple, there called *Sadal Kowa*, which yields a milky fluid of the same nature, and to those I now add the above described Fig tree, which I consider an undescribed species, and to which I have given the specific name *elastica*, on account of its milky juice. The manner in which the discovery was made is as follows.

Towards the close of 1810, Mr. Matthew Richard Smith of Silhet, sent me a vessel, there called a Turong, filled with honey in the very state in which it had been brought from the Pundua or *Juntipoor* mountains north of Silhet. The vessel was a common, or rather coarse basket in the shape of a four-cornered, wide mouthed bottle, made of split ratans, several species of which grow in abundance amongst the above mentioned mountains, and contained about two gallons. Mr. Smith observed that the inside of the vessel, was smeared over with the juice of a tree, which grows on the mountains. I was therefore more anxious to examine the nature of this lining than the quality of the honey. The Turong was therefore emptied and washed out, when to my gratification I found it very perfectly lined with a thin coat of *Caoutchouc*.

The tree as above observed, grows to a large size and chief-

ly in the chasms of the rocks, on the declivities of the mountains, that time has filled with the decomposed rocks, and vegetables; I also find the young trees grow with the greatest luxuriance in the common soil of the Botanic garden.

Old trees are said to yield a richer juice than the young ones, at least, they say the juice of the latter remains much longer in its fluid undecomposed state, than that of the former. It is extracted by incisions across the bark down to the wood, at a distance of about a foot from one other, all round the trunk or branch, up to the top of the tree; and the higher the more abundant is the fluid said to be. After one operation, the same tree requires about a fortnight's rest, when it may be again repeated. During the cool season, from October until March, the juice is more scanty than in the warm weather, from March to October, but richer.

When this juice is exposed to the air, like milk when rennet is added to it, it separates spontaneously into the firm elastic substance itself, and a fœtid whey-coloured liquid. Fifty ounces of the pure milky juice taken from the trees in August yielded exactly fifteen ounces and a half of the clean washed *Caoutchouc.*

With this milk, while in its rescent undecomposed state, the natives of the mountains, a most barbarous race as can be found in any part of the world, pay the inside of their rude utensils that are intended to hold fluids. The *Caoutchouc* itself being very inflamable, furnishes them with candles. and flambeaux. They say they do not know of any mode by which it can be dissolved after it has acquired its firm state.

On reading Mr. Gough's description of a property of *Caoutchouc* in the 13th volume of *Nicholson's Journal, p.* 305, I was induced to try if this sort acquired heat by sudden extension and again lost it by contraction. His method was followed by suddenly extending a slip, and when it was applied to the lips I was sensible of an increase of heat, but could not perceive any diminution of that heat when the slip was suffered to return to its original state of contraction. I also ap-

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plied the middle of two broad slips to the bulb of a thermometer, one on each side, so that the bulb was between them and found the mercury was raised two degrees, viz. from eighty, the temperature of the room where the experiment was made, to eighty-two, by a few quickly repeated extensions and contractions of the two slips; and as the bulb of the thermometer was placed in the middle of the slips, no friction upon it took place, consequently the increased temperature must be owing to another cause.

A thin slip twenty inches long, and half an inch broad, suspended in the sun-shine when the thermometer in the same place stood at 127, and kept straight by a light weight at its lower end, suffered no perceptible change; however it is likely that a nicer scale to measure any difference that might have taken place, would have detected some little change.

This substance, the produce of various other trees and vines, the most prominent of which are *Jatropha elastica. Linn. suppl.* 422. or *Siphonia Cahuchu. Willd.* iv. 567; the *Ule* tree or *Castilla elastica* of Cervantes the professor of Botany in Mexico, and *Urceola elastica. Asiat. Res.* v. 157. is already so well known as to render it unnecessary for me to enlarge on its qualities. I will therefore only add that this species of *Caoutchouc*, like that of *Urceola elastica*, is perfectly soluble in the essential oil obtained from the leaves of *Melaleuca Cajuputi*, commonly called *Cajuputi* oil.

26. F. *laccifera. R.*

Arboreous. *Leaves* long-petioled, from cordate to oval, obtuse-pointed, lucid, three-nerved. *Fruit* in axillary pairs, sessile, oval, smooth, scaly on the inside.

Kuthal But, the vernacular name of the tree in Silhet, where it is indigenous, and grows to as large a size, as F. *religiosa.* The fruit appears during the hot season and ripens in the rains.

*Young shoots* thick and smooth. *Leaves* alternate, petioled, from cordate to oval, obtuse, entire, three-nerved, firm



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and polished; from four to seven inches long, and from two to six broad. *Petioles* from one to two inches long, flattened, smooth. *Stipules* interfoliaceous, smooth, fine-pointed. *Fruit* axillary, sessile, oval, smooth, the size of a gooseberry. *Involucre*, or *calyx* of the fruit three-lobed. *Female corollets* only found. *Calyx* of four oblong leaflets scarcely longer than the germs. *Style* subulate. *Stigma* acute.

27. F. *sclerophylla. R.*

*Leaves* short-petioled, linear-oblong, hard and glossy, as are all the tender parts of the tree. *Fruit* in axillary pairs, short-peduncled, round, the size of a gooseberry, and yellow.

A large tree, a native of the forests of Chittagong.

28. F. *obtusifolia. R.*

Arboreous. *Leaves* alternate, short-petioled, from cuneiform, to linear-oblong, thick, hard and glossy. *Fruit* axillary, paired, or single, sessile, round, smooth, the size of a small gooseberry, and yellow.

A large elegant tree; a native of the forests of Chittagong, where it produces fruit during the hot and rainy seasons.

*Young shoots* polished, and marked with annular scars of the smooth, caducous, ash-coloured stipules. *Leaves* alternate, short-petioled, from linear-oblong to cuneiform, entire, obtuse, highly polished, and of a hard texture, about six inches long, and from two to two and a half broad. *Fruit* in axillary pairs, though one often fails, sessile round, smooth, the size of a small gooseberry, when ripe yellow; *umbilicus* rather sunk, and shut with a few smooth, large scales. *Calyx* of the fruit of three reniform glossy leaflets. *Male corollets* numerous, monandrous, and mixed amongst the sessile *female* ones through the whole of the inside of the receptacle; the perianth in both is three-leaved, the style in this species is remarkably long with a tapering, acute stigma.

29. F. *ramentacea. R.*

Arboreous, branches dropping roots. *Leaves* long ovate-

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cordate, acute, entire, in the bud hirsute, when expanded, smooth, strongly marked with simple parallel veins. *Petioles* short and ramentaceous. *Fruit* in short-peduncled, axillary pairs, smooth, the size of a small cherry, and red.

A small tree, a native of Chittagong, where it produces fruit during the rains. In drying, the leaves become particularly glossy, while in the bud and until pretty well expanded, the large simple parallel veins are very hairy. From the branches roots descend as in F. *Indica*, and some other species, but never grow to any size as in *Indica*.

30. F. *religiosa*. *Willd.* iv. 1134.

*Leaves* cordate, scollop-waved, cuspidate. *Fruit* in axillary, sessile pairs, vertically compressed, smooth, black.

Arcalu. *Rheed. Mal.* i. *t.* 27.

*Sans.* Pippula. See *Asiat. Res.* iv. 309. also Bodhi-drooma, Chuladula, Koonjurashuna, Aswattha.

*Beng.* Aswat, or Asood.

*Hind.* Pippal.

*Cing.* Bogaha.

*Teling.* Rai.

This very large tree is common in every part of India. I have frequently met with it wild upon mountains, but it is most common near houses, where it is planted for the sake of the extensive, dark, grateful shade it yields. Flowering time the hot season.

*Root* spreading horizontally to a great extent, and very near the surface of the earth, often on it, from the soil having been washed away by rain. *Trunk* erect, in small trees round, when large and old it becomes full of inequalities, *i. e.* large perpendicular ridges and hollows, as if many trunks were united; its thickness is very various, the largest trees that I have seen were about twenty feet in circumference but short in proportion to that thickness, being rarely more than twenty or twenty-five feet to the branches. *Bark* pretty smooth, ash-coloured. *Branches* very numerous, spreading,



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and rising in every direction to a great distance and height. *Branchlets* often pendulous. *Leaves* alternate, petioled, pendulous, cordate, long, or slender, ensiform, pointed with the margins scollop-waved, both sides perfectly smooth, the upper one of a deep shining green, about six inches long, of which the narrow point occupies nearly two, deciduous during the cold season. *Petioles* round, smooth, long, very slender, whence the constant trembling of the leaves arising from the most gentle air of wind, as in the *aspen* tree (*Populus tremula.*) *Stipules* sheathing, caducous. *Fruit* paired, axillary, sessile, vertically compressed; when ripe of the size and colour of a small black cherry. *Calyx* of the fruit three-leaved.

Birds eat the fruit greedily. The wood like that of F. *Indica* is white, light, and soon perishes, of course it is not much used. Next to the mulberry leaves I have found silk worms like the young tender leaves of this tree. Much tenaceous milky juice is discharged from fresh wounds made in the bark.

31. F. *cordifolia. R.*

*Leaves* long, slender, petioled, ovate-cordate, waved, acuminate, glossy. *Fruit* paired, sessile, round, smooth, black.

*Beng.* Guy-aswut.

Arbor Conciliorum. *Rumph. Amb.* iii. *t.* 90.

Found in the vicinity of Calcutta, where it grows to be a large, very ramous, spreading tree. I never observed it on the Coromandel coast. Like F. *religiosa*, which it most resembles, the trunk is short; while young round and straight, but when old deeply furrowed, as if composed of many coalesced trunks.

*Bark* smooth. *Branches* spreading, seldom radicating. *Leaves* petioled, ovate-cordate, waved, most entire, fine pointed, smooth and shining on both sides, somewhat three-nerved, with the veins less numerous and less distinct than in F. *religiosa.* *Petioles* long, slender, nodding, giving to their

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leaves a tremulous motion with the least wind. *Stipules* as in the genus. *Fruit* paired, axillary, sessile, round, smooth, when ripe of the size and appearance of a black cherry. *Calyx* of the fruit three-leaved. *Navel* closed with three small scales.

*Obs.* It approaches nearest to F. *religiosa*, of any species I know, yet is easily to be distinguished from it by the leaves being narrower in proportion to the length, with much shorter points, and instead of the lobes forming a sinus at the base, there is a small degree of projection at the insertion of the petiole. And in the second place by the fruit being perfectly round, and not, as in *religiosa*, vertically compressed.

32. F. *Tsiela.*

*Leaves* long-petioled, ovate-oblong, acute, polished; *veins* parallel and simple. *Fruit* paired, axillary, sessile, round-turbinate.

Tsiela. *Rheed. Mal.* iii. *t.* 63. seems to be this tree.

*Teling.* Joovee, or Pedda-Joovee.

This next to F. *religiosa*, is the largest species I know. Its native station is the mountains, but it is also found every where on the low lands planted with F. *Indica* and *religiosa*, where it grows to be nearly as large, and is equally shady.

*Bark* smooth, greenish, no roots from the trunk, nor branches. *Leaves* alternate, petioled, somewhat three-nerved, ovate-oblong, pointed, most entire, firm, smooth on both sides, shining, particularly on the upper side, with numerous, simple and parallel veins, from four to six inches long, and from two to three broad. *Petioles* a little compressed, from one to two inches long. *Stipules* as in the other species, but in this they leave no durable cicatrice. *Fruit* paired, axillary, sessile, a little inclining to be turbinate, smooth, the size of a cherry, when ripe purple. *Calyx* of the fruit small, three-leaved. *Umbilicus* shut up with scales.

*Note.* Plukenet's figure, referred to by Linnæus is good.

From wounds in the bark there issues a little, pale, glutinous, milky juice.

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33. F. *Benjamina. Willd.* iv. 1143.

*Leaves* oval, and obovate, obtuse, polished. *Fruit* axillary, paired, smooth.

Itty-Alu. *Rheed. Mal.* i. *t.* 26.

*Teling.* Yerra *joovee.*

This is also a large tree, and a native of the Circar mountains.

*Young shoots* slender, perfectly smooth, as if polished. *Leaves* alternate, short-petioled, slightly three-nerved, obovate, entire, obtuse, firm, smooth, shining; *veins* numerous, alternate, parallel. *Petioles* many times shorter than the leaves, channelled, smooth. *Fruit* axillary, sessile, paired, smooth, the size of a pea, when ripe purple with small yellowish specks; *umbilicus* even with the apex of the fruit, and shut up with scales. *Calyx* of the fruit, three-leaved.

34. F. *tomentosa. Willd.* iv. 1136.

*Branches* dropping small roots. *Leaves* oblong-cordate, pointed, very downy underneath. *Fruit* axillary, paired, sessile, woolly.

*Teling.* Petta mari.

A very large tree, a native of mountainous tracts; and like F. *Indica* gives out roots from its branches, though they do not grow large.

*Young shoots* woolly. *Leaves* alternate, petioled, oblong-cordate, slightly three-nerved, a little pointed, entire, on the upper side pretty smooth, on the lower one very downy, from four to six inches long; on the under side of the base of the middle nerve there is a large smooth, green gland, as in F. *Indica. Petioles* an inch long, channelled, woolly. *Stipules* as in the genus, but very woolly. *Fruit* axillary, paired, sessile, woolly, the size of a large pea, when ripe gray. *Calyx* very large, three-leaved; *leaflets* spreading, woolly.

Birds eat the fruit; the wood of this tree, as well as of all the preceding five species, is white, very light, and of little or no use, even for fuel.

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35. F. *infectoria. Willd.* iv. 1137.

*Leaves* ovate-oblong, acute, waved, smooth. *Fruit* paired, axillary, sessile, round, smooth, white.

Placsha (Plucksha.) *Asiat. Res.* iv. 310.

*Beng.* Pakur.

Tsjakela. *Rheed. Mal.* iii. *t.* 64.

F. Tsjakela. *Burm. Fl. Ind.* 227.

A large and most beautiful tree with a far extended uncommonly dense head; a native of Bengal, I never met with it on the Coromandel coast. The trunk is large, and irregular like that of F. *religiosa*, sometimes dropping roots of considerable magnitude from the trunk and branches.

*Bark* pretty smooth, of a brownish ash-colour, very tough, and peeling off in long slips. *Leaves* alternate, petioled, oblong-cordate, pointed, waved, smooth on both sides, with few veins; from four to six inches long, and from two to four broad. *Stipules* about two inches long, slender, grooved, with a coloured gland round their apices. *Fruit* paired, axillary, sessile, the size of a pea, roundish, pretty smooth, when ripe white.

36. F. *rapiformis. Roxb.*

Arboreous, smooth. *Leaves* solitary and in pairs, petioled, oval, pointed, entire, a ring of scabrous specks below the insertion of the stipules. *Fruit* axillary, solitary, short-peduncled, turnip-shaped.

Introduced into the Botanic garden at Calcutta, from the Moluccas in 1798. In five years the young trees were from ten to twenty feet high, and produced fruit about the close of the rains, in September and October.

*Trunk* straight; *bark* ash-coloured and smooth. *Branches* many, spreading, the tender parts covered with smooth green bark. *Leaves* scattered, solitary, and also sometimes in pairs, petioled, of various shapes, but nearly oval and pointed is the most prevailing one, with the margins entire, smooth on both sides, from four to eight inches long, and about half that in

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breadth. *Petioles* about an inch only, flat on the upper side; a waxy gland on each side of their insertion. *Stipules* within the leaves, just below their insertion a ring of permanent scabrous dots surround the branchlet. *Fruit* axillary, solitary, short-peduncled, size of a small medlar, turnip-shaped, concave at both apex and base, dotted with small white scabrous specks. *Calyx* of the peduncle none; of the fruit two, or three-leaved; *leaflets* small, thick and glandulous. *Umbilicus* shut with numerous scales.

37. F. *excelsa. Vahl. en. pl.* ii. 195.

Arboreous, smooth. *Leaves* short-petioled, bifarious, obliquely-oblong, smooth. *Fruit* solitary or paired, peduncled, sub-turbinate. *Calyx* of the peduncle tridentate; *navel* round.

Atti meer alou. *Rheed. Mal.* iii. *t.* 58.

Introduced from the Moluccas, into this garden. The fruit appears about the beginning of the rains.

*Trunk* and *branches* straight; as yet the trees are not more than ten or twelve feet high, and spread but little. *Bark* smooth, of a greenish ash-colour. *Leaves* alternate, bifarious, unequally oblong, sometimes pointed, entire, smooth above and slightly scabrous underneath, the middle nerve nearer the upper margin than the under one; about six inches long, and about three broad. *Fruit* axillary, solitary or paired, peduncled, nearly round, the size of a cherry, smooth, when ripe yellow. *Calyx* of the peduncle three-toothed, of the fruit none. *Umbilicus* small, round, shut on the inside with minute scarcely visible scales.

38. F. *comosa. Willd.* iv. 1148. *Corom. pl.* ii. *N.* 125.

*Leaves* oblong-ventricose, pointed, smooth. *Fruit* in pairs, generally terminal, turbinate, smooth, red.

*Teling.* Pootra-*joovee.*

This is a pretty large tree, a native of the Circar mountains. It has a large spreading, very branchy shady top, the

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bark is pretty smooth, and ash-coloured, the branchlets are very slender, much sub-divided, and often pendulous.

*Leaves* alternate, petioled, oval, obliquely-pointed, entire, firm, smooth and shining, from two to four inches long. *Petioles* very slender, about an inch long, grooved. *Fruit* terminal, or in the exterior axills, paired, sessile, size of a gooseberry; *apex* depressed with the umbilicus rising a little in the centre, which is shut up with the scales; contracted at the base, something like the neck of a bottle, smooth, when ripe of a rich deep yellow colour. *Calyx* of the fruit three-leaved. *Proper perianth* of the male and female corollets, (there are no hermaphrodite that I could find) three-leaved; *leaflets* lanceolate. *Filaments* single. *Anthers* two-lobed. *Style* long, slender. *Stigma* filiform, two-cleft.

*Note.* I observed a hood over the rudiments of the young fruit, which fell off as soon as they began to increase in size.

39. F. *urticifolia. R.*

*Leaves* cordate, three-nerved, serrate, hispid above, downy underneath. *Fruit* in axillary pairs, long-peduncled, turbinate in a rather remote three-leaved calyx, downy, the size of a small gooseberry.

A native of the mountains north of Bengal.

40. F. *ampelos. Kön. Mss.*

*Branches* dropping fibrous roots. *Leaves* obliquely oval, scabrous. *Fruit* paired, axillary, pedicelled, pisiform, smooth, yellow.

*Teling.* Tella-barinka.

A large tree, a native of mountainous countries chiefly.

*Trunk* remarkably short, but very thick, and sometimes so completely ornamented with small, very leafy branchlets, as to hide it entirely; a most beautiful tree, thus embellished is to be seen at Ganjam. Top very large, spreading to a great distance; I have seen small pendulous, filiform roots, issuing from the larger branches. *Bark* smooth, ash-coloured with



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a dusky film. *Leaves* alternate, tending to be bifarious, spreading, short-petioled, obliquely oval, obtusely pointed, a little scolloped, scabrous, and very firm; generally about three or four inches long. *Petioles* short, curved, channelled. *Stipules* small, as in the rest of the family. *Fruit* axillary, paired, peduncled, when ripe the size of a pea, and yellow. *Calyx* of the fruit none, of the peduncles three-leaved, small. The leaves are used to polish ivory.

41. F. *asperrima. Roxb.*

*Leaves* oval, often scolloped, very scabrous. *Fruit* axillary, paired, peduncled, round, downy.

Teregam. *Rheed. Mal.* iii. 60.

*Teling.* Karakar-booda.

A large tree, a native of moist valleys.

*Trunk* erect. *Branches* numerous, spreading into a large shady head. *Branchlets* rust-coloured, scabrous. *Leaves* alternate, about the extremities of the branchlets petioled, broad, oval, obtusely pointed, sometimes notched, and even lobate, very scabrous, a little wrinkled, three-nerved, from four to six inches long. *Petioles* about an inch long, scabrous. *Stipules* as in the family. *Fruit* axillary, paired, peduncled, downy, size of a gooseberry, when ripe yellow.

42. F. *tuberculata. R.*

*Leaves* short-petioled, oblong, entire, acute, rough. *Fruit* in pairs, peduncled, roundish, the size of a large pea, tubercled, the umbilicus elevated.

*Teling.* Kouda-joovee.

A native of the mountains of Coromandel, where it grows to be a small very ramous tree.

43. F. *angustifolia. R.*

*Leaves* sub-opposite, lanceolate, smooth, acute. *Fruit* axillary, paired, long-peduncled, turbinate, smooth.

A large tree, a native of the Circar mountains.

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*Branchlets* rust-coloured, but smooth. *Leaves* between alternate and opposite, short-petioled, most slightly three-nerved, broad-lanceolate, or oblong, sharp-pointed, smooth on both sides, entire; from four to eight inches long. *Stipules* as in the genus. *Fruit* axillary, paired, long-peduncled, turbinate, the size of a large pea, smooth; *umbilicus* elevated. *Calyx* of the fruit none, but there is a small three-scaled one at the base of the peduncle.

SECT. II. *Fruit fasicled, racemed, or panicled.*

44. F. *exasperata. R.*

Arboreous. *Leaves* short-petioled, oblong, acuminate, repand-serrate, rough on both sides. *Fruit* axillary, solitary, or in pairs, peduncled, round, size of a pea.

A native of the eastern parts of India and introduced into this garden in 1798. By the close of 1802, the trees were from twelve to fifteen feet high, with an erect trunk and branches; covered with rust-coloured, pretty smooth bark;

*Young shoots* scabrous. *Leaves* alternate, short-petioled, oblong, somewhat three-nerved, repand-serrate, acuminate, scabrous on both sides, so much so that they are fit to polish wood, and ivory with; from three to six inches long, and from one and a half to three broad. *Fruit* axillary, solitary or in pairs, peduncled, rough, the size of a small pea; *umbilicus* small, depressed, and shut with coloured scales.

*Folium politorium, Rumph. Amb.* iv. *t.* 63, agrees with the leaves of our oldest trees, and as they were brought from Amboyna, I conclude they are the same. Louriero's F. *politoria* is certainly different, for there is nothing like a spike to be found on our trees; besides Louriero describes his to be a shrub only. It ought, however, to be compared with F. *politoria. Willd.* iv. 1144.

45. F. *rotundifolia. R.*

*Leaves* round, scollop-serrate, downy underneath. *Fruit*



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peduncled, numerous about the base of the annual shoot, round, hairy.

A native of the mountains north of Bengal.

46. F. *polycarpa. R.*

Arboreous. *Leaves* oblong, some of them slightly waved, or serrulate, both sides scabrous. *Fruit* in fascicles, from the trunk, or woody branches.

Introduced from the Moluccas into the Botanic garden at Calcutta, in 1798, they are only small trees at present. In fruit about the close of the rains.

*Trunk* straight; *branches* sub-erect. *Bark* of the ligneous parts dark brown, and rather scabrous; of the young shoots a little scabrous, with a few short bristles rising single from the centre of a small umbilicated gland. *Leaves* alternate, oblong, somewhat three-nerved; *margins* sometimes entire, sometimes waved, or remotely serrulate, both sides scabrous, from the same sort of bristles and glands as cover the bark of the young parts; a green gland in the axills of the nerves, as in F. *laciniata;* from four to six inches long. *Petioles* coloured, from one to two inches long. *Stipules* as in the genus. *Fruit* in fascicles of as far twenty, from the large branches, or trunk, peduncled, round, the size of a large pea, scabrous with glands and short bristles. *Umbilicus* small, round, and shut with scales. *Calyx* of the fruit none, of the peduncles or bractes, obscure, small and crowded.

47. F. *macrophylla. R.*

Arboreous. *Leaves* round-cordate, three-nerved. *Fruit* collected in bundles near the root, turnip-shaped, from eight to twelve-ribbed, hairy.

I have only found this species in the Company's Botanic garden, where it is in fruit the whole year. It was originally brought from Nepal. It is however, a native of Silhet and Chittagong also.

*Trunk* short, for it soon divides into a few, stout branches,

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generally by threes, which subdivide irregularly, and spread in every direction. *Bark* brown and considerably scabrous. The tree rarely exceeds twenty feet in height, and spreads as much. *Leaves* alternate, petioled, round-cordate, entire, between obtuse and pointed, three-nerved, above smooth, deep green, marked with some white dots; below very pale, somewhat downy, and reticulate with many transverse small veins; from twelve to eighteen inches long, and nearly as broad. *Petioles* round, from three to six inches long. *Stipules* within the leaves, as in the other species. *Fruit* peduncled, fully as large or larger than the common fig, collected in branches of from six to twenty, on projecting tuberosities on the trunk, and lower parts of the largest branches, they are turnip-shaped, hairy, glandular, and marked with from eight to twelve ridges running from the base to the apex. *Calyx* three-leaved, pressing upon the fruit. *Umbilicus* very large and closed with innumerable heart-shaped, acute scales, some few of which often extend to some distance round its mouth. *Flowers*, only females found, I could not observe any *perianth*; the *stigma* single, hairy, of a beautiful rose-colour.

The fruit is eaten by the natives in their curries where the tree is indigenous; every part of it is replete with much, very tenaceous, milky juice, which flows abundantly from fresh wounds.

48. F. *lanceolata*, of *Dr. Buchanan.*

Shrubby. *Leaves* lanceolate, smooth, entire. *Fruit* in fascicles near the root, as well as on the trunk and larger branches, peduncled, verrucose, compressed, turbinate, with the umbilicus in the bottom of a deep concavity.

A native of Chittagong, and from thence sent by Dr. Buchanan to this garden in 1798, where it produces fruit, more or less, the whole year round; but chiefly about the beginning of the rains.

*Trunk* scarcely any, but many ascending branches issuing

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from the crown of the root. *Bark* of the old woody parts ash-coloured, of the young shoots smooth, and green, height of the whole plant in ten years about ten feet, and spreading to a great extent. *Leaves* alternate, short-petioled, lanceolate, entire, smooth on both sides, from four to eight inches long, and from one to one and a half broad. *Stipules* as in the genus, smooth and membranaceous. *Fruit* peduncled and collected in small fascicles, from six to eight together, on the stem and larger woody branches near the base, of a short, broad, turbinate shape, much compressed, with a very deep concavity on the crown; in the bottom of which is the umbilicus, shut up with many, fleshy imbricated scales, colour a dark brown, with numerous, verrucose, white specks. *Calyx* generally three small scales at the apex of the peduncle. *Corollets* all female, that were examined.

49. F. *glomerata. Willd.* iv. 1148. *Corom. pl.* ii. *N.* 123.

*Leaves* broad-lanceolate, smooth. *Fruit* in bundles from the trunk and large branches, peduncled, downy, turbinate.

*Oodoombur. Asiat. Res.* iv. 309.

*Hind.* Doombur.

*Beng.* Jugya-doomoor.

*Teling.* Bruma-mamadee.

A large tree, generally found in and about villages, and on the banks of rivers, and water courses, where the soil is rich and moist.

*Trunk* seldom straight, but thick and high. *Branches* thin, and more erect, than in any of the former trees. *Bark* of a rusty greenish colour, and scabrous. *Leaves* alternate, petioled, oblong, or broad-lanceolate, tapering equally towards each end, entire, most slightly three-nerved, smooth on both sides; the under side is paler and covered with most minute green dots, from four to six inches long, and from two to two and a half broad. *Petioles* channelled, from one to two inches long. *Stipules* as in the other species. *Racemes* compound, or panicled, issuing immediately from the trunk or

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large branches, ramifications spreading and jointed. *Bractes* several surrounding the joints, two-fruited, at least there are always the germs of two, but rarely both come to muturity. *Fruit* pedicelled, nearly as large as common figs, clothed with much soft down, when ripe of a rich orange colour, umbilicus closed with innumerable scales. *Calyx* of the fruit small, three-leaved.

The fruit is eaten by the natives. I have often tasted them, but to me they are disagreeable. This species yields much milky juice.

50. F. *conglomerata. R.*

Arboreous. *Leaves* alternate, sub-semi-cordate, cuspidate, rough and hard. *Fruit* roundish, tubercled, crowded on long, procumbent, or drooping, decompound, cauline, leafless branches.

Borum of the natives of Chittagong, where the tree is indigenous. In the Botanic garden at Calcutta, it is loaded with fruit the whole year.

*Trunk* tolerably straight. *Bark* of a dirty olive colour. *Branches* numerous, spreading in every direction; *bark* of the young shoots rough and hairy; height of the trees in the Botanic garden, now eleven years old, about twenty feet, and they seem full grown. *Leaves* alternate, short-petioled, by far the greater part of them unequally long-cordate, while the plants are young, serrulate; when old, entire, firm, and very scabrous, particularly on the upper surface; from four to ten inches long, and about half that in breadth. *Stipules* interfoliaceous, and caducous. *Fruit*, from the lower part of the trunk of our trees issue numerous procumbent, diverging, or drooping, ramous, leafless branches, crowded with numerous, sessile, roundish, scaly, warted figs, about the size of a large filbert with a large scaly umbilicus. *Proper perianth* of the female of five, lanceolate leaflets. *Male florets* few, monandrous, with a three-leaved perianth.

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51. F. *congesta. Roxb.*

Arboreous, smooth. *Leaves* petioled, oblong, entire, smooth. *Fruit* roundish-turbinate, sessile, heaped on radical, and cauline, short, leafless, ramous branchlets, or panicles.

Mussu of the Malays at Amboyna, where it is indigenous, though by no means like that figured in the *95th Table of Rumph. Herb. Amb. vol.* iii. under the same Malay name.

Introduced into the Botanic garden at Calcutta in 1802, and in 1809. They are now from eight to twelve feet high, with a straight trunk, branches few, clothed with dark brown, now while young trees, smooth bark.

*Leaves* opposite, and alternate, short-petioled, oblong, entire, smooth, deep green; about six inches long, and about three broad. *Fruit* short-peduncled, sometimes a single one or two are found in the superior axills, but by far the most common on large compound racemes or panicles projecting from the trunk, and far the most near the root. They are about the size of a filbert, turbinate, smooth. *Stamina* single. *Stigma* sessile, bright red.

52. F. *racemifera. R.*

Arboreous. *Leaves* alternate, cordate, crenulate. *Fruit* on compound, glomerate racemes, from the woody part of the tree, below the leaves.

Caprificus amboinensis. *Rumph. Amb.* iii. *t.* 93.

A native of Sumatra, from thence introduced into the Botanic garden by Dr. Charles Campbell. The trees are small, and in fruit most part of the year. *Leaves* deciduous during the cold season.

*Trunk* straight, tapering. *Bark* smooth, dark greenish brown. *Branches* very numerous, and spreading in every direction; *young parts* smooth. *Leaves* alternate, petioled, cordate, crenate, from three to five-nerved, smooth on both sides, from six to twelve inches long. *Petioles* round, smooth, scarcely half the length of the leaves. *Stipules* within the leaves, caducous. *Racemes* often compound, or decompound,

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projecting at right angles or drooping from the larger naked branches. *Bractes* stipule-like, caducous, long before the fruit appears. *Fruit* solitary, short-peduncled, of a short, flattish, turbinate shape. *Calyx* none.

53. F. *cunia. Buch.*

Arboreous. *Leaves* short-petioled, alternate, bifarious, oblong, semi-cordate at the base, acutely serrate. *Fruit* turbinate, ribbed, pedicelled, and generally in pairs, in compound, prostrate, radical, and cauline, leafless branchlets.

A native of Nepal, from thence Dr. Buchanan sent seeds to the Botanic garden at Calcutta, at the close of 1809; the only tree which was reared, was about twenty feet high; uncommonly well clothed with long spreading branches down to the ground, and constantly loaded with fruit.

*Leaves* short-petioled, bifarious, oblong, lanceolate, acute, at the base, the lower half protruding so as to form a large sub-rotund lobe, which is longer than the petiole, margins a little waved, and serrated, scabrous on both sides, from six to twelve inches long, and from two to four broad. *Fruit* pedicelled, somewhat turbinate, a little ribbed, of the size of a large filbert, hairy, they are generally produced in pairs, or in threes, on long, procumbent, radical, and cauline, compound, leafless branches, in compound racemes often some feet long. *Calyx* of the fruit three-cleft, presses in to the calyx.

54. F. *oppositifolia. Willd.* iv. 1151. *Corom. pl.* ii. *N.* 124.

*Leaves* opposite, oblong, serrate. *Fruit* in axillary pairs, or on cauline racemes, round, peduncled, hairy.

*Hind.* Konea-Doombur.

*Sans.* Kako-Doomburika.

*Beng.* Kakodoomoor.

*Teling.* Boda-Mamadee.

A small tree, a native of the banks of rivulets, and other



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places, where the soil is moist and rich, common about Calcutta.

*Trunk* erect, seldom as thick as a man's body. *Branches* opposite, sub-erect. *Bark* scabrous, ash-coloured. *Young shoots* scabrous, and covered with much short white hair, piped, and interrupted at the insertion of the leaves, as in the Bamboo. *Leaves* opposite, short, round, petioled, oblong, slightly serrate, of a firm, scabrous texture, shining above, downy below, and most beautifully reticulate, one of each pair is always considerably smaller than the other; they are from five to nine inches long. *Fruit* on the young shoots axillary and peduncled, in the naked woody branches racemed, round, about the size of a large nutmeg, covered with much short, white hair, several equi-distant ridges running from the umbilicus to the base. *Racemes*, and *bractes* as in F. *glomerata*, only here simple. *Calyx* of the fruit three-leaved. *Flowers*, a few round the inside of the mouth of the navel. *Filament* or *peduncles* single, with a proper, three-parted perianth surrounding the middle. *Female flowers* numerous. *Peduncles* long. *Perianth* none. *Style* and *stigma* placed together on the side of the germ, funnel-formed.

This species is productive of much tenaceous milky juice on being wounded. The fruit is not often eaten, nor is the tree used for any purpose that I know of.

55. F. *dæmona. Kön. Mss. Vahl. En. Pl.* ii. 198.

Shrubby. *Leaves* generally opposite, cuneate, oblong, and oblong-pointed, serrate, above scabrous, downy underneath, with a green gland in the axills of the veins. *Fruit* in pairs on long radical racemes, above very hairy, of the size of a nutmeg.

A native of the sandy lands near the sea on the coast of the Tanjore Country. From thence Dr. Rottler sent plants to this garden where they produce fruit, all the year round. In its native barren soil it grows to be a stout ramous shrub, or small tree.

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*Young shoots* densely clothed with thick, soft, appressed, white hairs. *Leaves* in general opposite, petioled, oblong, and oblong cuneate, acute, serrate, above smooth, but hard, downy underneath, and elegantly reticulated with numerous, soft, hairy veins, and a deep green, smooth gland in the axills, from two to twelve inches long, one of the pair is always smaller than the other, and when single often oblique as in *Begonia*. *Petioles* round, clothed with appressed pubescence, in each side of their insertion is a green gland. *Stipules* within the leaves, caducous. *Fruit* for the most part in pairs, in radical withering racemes, and frequently of great length, with their apices penetrating the earth. In their native soil the whole raceme, and fruit are often entirely under ground; also found single or in pairs on the trunk and branches, though less frequently than on the root. They are generally about the size of a large nutmeg, obovate, very hairy; the mouth shut with numerous scales, the exterior ones glandular and more remote; several obscure, equi-distant ridges run from the umbilicus toward the base. *Calyx* of the fruit of three-minute scales. *Male corollets* monandrous.

In habit this plant is very much like F. *oppositifolia*, but the inflorescence is very different.

## *CHARA.*

*Male calyx* none. *Corol* none. *Anthers* solitary under the germ. *Female calyx* four-leaved. *Corol* none. *Stigma* from three to five-cleft. *Nut* spiral, many-seeded.

1. C. *verticillata. Roxb.*

*Joints* of the stems and branches somewhat prickly. *Leaves* verticelled, ten or twelve-jointed, with flowers on the two or three lower joints. *Calyx* of the other joints abortive.

A native of India, where it grows in standing sweet water; it appears and flowers during both the cold and hot seasons.



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*Stems* and *ramifications* numerous, several feet long, floating in the water, jointed, striated, fragile, scabrous, piped, but no stony crust covers them. *Leaves* about twelve in the verticel, tapering, from ten to twelve-jointed, they are about as long as the points of the stem or branches, on the upper side of each joint are four minute bristles, or leaflets of the calyx. *Flowers*, they occupy the upper side of the first two or three joints of the leaves of the verticel. *Male flowers*, what I take for them, are the small, naked, orange-coloured, round bodies close to the base of the germ, which gradually decay as the germ acquires size. *Female flowers* solitary, just above the male, pitcher-shaped, embraced by the four bristle-like leaflets, already mentioned, and crowned with a fine pointed *stigma*; when this body comes to maturity, it contains one black, spirally grooved seed.

2. C. *furcata. R.*

*Stems* filiform, smooth. *Leaves* verticelled, proliferous, with flowers crowded in the divisions.

*Beng.* Jhanj, which is the general name for all such acquatic plants.

Found in tanks, and stagnant sweet water near Calcutta.

*Stems* and *branches* numerous, jointed, smooth, and of a soft, flaccid texture, often several feet long. *Leaves* or *branchlets* verticelled, about six or seven in the verticel, the superior, or flower-bearing ones proliferous, the most distinct of them resembling compound, and even decompound umbels, with the extreme divisions or joints two or three-pointed, they are smooth in every part; the joints are often so soft, and numerous that the whole seem to be little intricate balls enclosing the blossoms, and seeds with their two-forked extremities projecting hedgehog-like. *Flowers* numerous, in the divisions of the leaves; the *male* ones yellow, and the *female* ones green, mixed, in general the latter are most numerous. *Calyx* of the female no other than the division of the leaves. *Seeds* globular, spiral, with the stigma from three to five-parted on its apex.

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3. C. *involucrata. Roxb.*

*Stems* and *branches* filiform, smooth. *Leaves* verticelled, undivided, three or four-jointed, with a male and female flower on each joint.

*Beng.* Jhanj.

Found in tanks and pools of water near Calcutta during the cold and hot seasons.

*Stems* and *branches* numerous, and several feet in length, floating in the water, jointed, filiform, smooth and of a soft texture. *Leaves* verticelled, smooth, and generally compound, of three or four joints with the leaves two-pointed. *Bractes* or *involucre*, a whorl of short, pointed bodies, alternate with the leaves, and placed immediately under them. *Flowers* on the joints of the leaves. *Calyx* &c. of both male and female, as in the last described.

## MONOECIA DIANDRIA.

### *LEMNA. Schreb. gen. N.* 1430.

*Male calyx* one-leaved. *Corol* none. *Female calyx* one-leaved. *Corol* none. *Style* one. *Capsule* one-celled, two-seeded.

1. L. *orbiculata. R.*

*Leaves* sub-sessile, orbicular, flat on both sides, from two or three together. *Roots* fascicled, simple.

Found most part of the year, floating on stagnant water in Bengal.

2. L. *globosa. R.*

Single, globular, rootless, minute, one, or at most two together, singly about the size of a grain of sand.

With L. *orbiculata*, found in very great abundance on tanks and pools of stagnant water in Bengal forming a compact green scum, over the surface.

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3. L. *cruciata. R.*

*Leaves* petioled, lanceolate, proliferous, flat on both sides. *Root* solitary or wanting.

Found in Bengal, and generally under the surface of the water in tanks, in most extensive interwoven masses.

## MONOECIA TRIANDRIA.

### *TYPHA. Schreb. gen. N.* 1401.

*Male ament* cylindric, compact. *Perianth* filiform. *Corol* none. *Female ament* cylindric, beneath that of the male. *Perianth* of several fine filaments. *Corol* none. *Seed* one.

1. T. *elephantina. Roxb.*

*Leaves* ensiform, obtuse, flat on the inside, the length of the stems. *Male ament* from two to three inches above the female. *Filaments* solitary, with from one to three anthers; *neuter corollets* mixed with the fertile female ones.

*Beng.* Hogla.

*Teling.* Emiga Junum.

Elephant grass.

It grows in standing sweet water, or slow running rivers and brooks, which do not dry up during the hot season. Flowers during the wet and cold seasons.

*Root* stoloniferous, perennial. *Culms* straight, round, smooth, glossy, jointed at the insertion of the leaves, and involved, except near the ament, in their sheaths, the naked part near the ament is about the thickness of a common black lead pencil; substance spongy, from six to twelve feet high. *Leaves* long, ensiform, very smooth in every part, below near the sheath a little convex on the outside and concave within, from four to six feet long above the sheaths, and three quarters of an inch broad; *sheath* smooth, embracing the culm, and the sheaths of the inner leaves. *Male ament* from two to three inches above the *female* one and terminating the culm, cylindric, about a foot long and scarcely as thick as the little

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finger, every part most closely set with stamens and most fine white filaments. *Spathes* of the male ament, three or more, one, the largest, inserted at its base, a second and smaller a little above the middle, and a third still smaller near the apex, and generally two very small ones at the apex; they all drop off soon after the flowers expand. *Calyx perianth proper.* The filaments that are intermixed with the stamen are so minute that I cannot assign any number to any number of filaments, their extremities are from two to three-cleft. *Corol* none. *Filaments* exceedingly numerous, short, simple, from two to three-cleft, inserted without order. *Anthers* one to each single filament or sub-division, linear, yellow, with green tops, which makes the ament look green, caducous, leaving a naked withered receptacle. *Female ament* about as long and as thick as the male. *Spathe* of the female ament single, leaf-like, its sheath is so long as to involve both aments. *Calyx* permanent, and consisting of most fine capillary filaments. *Pistil* as in the family. *Seed* oblong, they are carried about with the wind like the seeds of the thistle by means of the permanent downy filiform calyx; but there are many clubbed bodies intermixed with the female flowers, these also have a calyx or involucre of the finest filaments like that of the female flowers. Elephants are fond of it; the leaves are used for thatch, by the natives.

2. T. *angustifolia. Willd.* iv.

*Leaves* semi-cylindric, acute, the length of the scape. *Male* and *female aments* rather remote.

T. minor. *Curt. Flor. Lond. t.* 169.

*Beng.* Kam Hogla.

Found in similar places with the former; flowering time also the same, but this is a smaller and much rarer plant.

*ZEA. Schreb. gen. N.* 1403.

*Male* in distinct spikes. *Calyx; glume* two-flowered, awn-

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less. *Corol; glume* awnless. *Female calyx; glume* two-valved. *Corol; glume* two-valved. *Style* single, filiform. *Seed* immersed in an oblong receptacle.

Z. *mays. Willd.* iv. 200.

Mays, Maize, or Indian corn.

*Teling.* Moka, Joona.

*Beng.* Bhoota or Mukka.

Cultivated in various parts of India in gardens, and only as a delicacy; but not any where on the continent of India so far as I can learn, as an extensive crop.

*COIX. Schreb. gen. N.* 1405.

*Male flowers* for the most part on a separate spike. *Calyx* two-valved, two-flowered, awnless. *Corol, glume* awnless. *Female flowers* for the most part solitary. *Calyx* or *involucre* one-valved, one-flowered, valve becoming an ossified shining covering for the seed. *Corol* various; *glumes* awnless.

1. C. *lacryma. Willd.* iv. 202.

*Leaves* at the base cordate; *pedicels* naked, not jointed. *Male spikes* nodding; *flowers* paired. *Calyces* smooth, ovate.

Lithagrostis *lacryma Jobi. Gært. Sem.* i. 7. *t.* 1.

Cafre or Catri Conda. *Rheed. Mal.* xii. *t.* 70.

Lachryma Jobi Indica. *Rumph. Amb.* v. *t.* 75. *f.* 2.

*Beng.* Gurgur or Kanch.

I have only found this plant in Bengal; what Dr. König and I took for it on the coast, is evidently another species which I now call C. *Barbata.* It is common on the rice grounds and in ditches, and grows to the height of from four to six feet.

*Culms* annual, ramous, smooth, emitting roots from the lower joints. *Leaves* sheathing, from four to eighteen inches long, and from one to two broad; the broadest part near the base,

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and there cordate. *Spikes* axillary and terminal, several together, from two to three inches long, sub-erect, peduncled. MALE FLOWERS on the short, nodding, solitary, mealy spikes, from the apices of the female flowers they are in pairs; one sessile, the other peduncled. *Calyx; glume* two-flowered, two-valved; the exterior valvelet oval, with broad margins. *Corol* two-valved. *Nectary* two scales embracing the base of the filaments. FEMALE FLOWERS solitary. *Calyx* or *involucre* one-valved, entire, with a perforation at top for the pedicel of the male spike and stigmas to pass through. *Corol; glume* four-valved; *valvelets* fleshy, on one side of the corol are lodged two somewhat clavate bodies each supporting the rudiments of the corollet. *Germ* ovate. *Pericarp* no other than the calyx or involucre, now white and of a bony hardness.

2. C. *barbata. Roxb.*

*Pedicels* short, jointed, with a boat-shaped, cuspidate spathe at the joint. *Male spikes* erect; *flowers* paired; *calyx* hairy. *Female corol* four-valved. *Seeds* oval.

*Beng.* Gurgur.

*Teling.* Ghella-Gadee.

Is found in rice fields, and on the banks of water courses, in a moist, rich soil in the Northern Circars.

*Roots* annual. *Culms* erect and near the top, bowing a little, ramous, jointed, smooth, sulcated, not piped, but replete with a soft spongy substance, from three to six feet high, and as thick as a common quill; joints sometimes bearded. *Leaves* sheathing, from two to three feet long, narrow keeled; *margins* armed with small prickles, on the upper side sometimes a few, sometimes numerous, stiff, white hairs, mouths of the sheaths slightly bearded. *Spikes* numerous, pedicelled, terminal, and from the exterior axills, forming altogether a large linear panicle, collected in fascicles of from two to six on a common peduncle, and embraced by a common spathe. *Pedicels* compressed, jointed near the top and



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there a partial spathe, their insertions are intermixed with lanceolate, chaffy scales. MALE FLOWERS in pairs, one a little above the other in a second spike above the female. *Calyx* two-flowered; *valvelets* obliquely oblong, hairy on the outside. *Corol* as in the genus. FEMALE FLOWERS solitary, below the male. *Calyx*, or *involucre*, consisting of one oval, very hard, glossy valve, which embraces most completely the corol, its margins are double, not united, and through this duplicature the pedicel of the male spike passes. *Corol* four-valved, the interior two large and somewhat fleshy.

The rest as described in the *Genera Plantarum*. The grass is of a coarse nature. Cattle do not eat it.

3. C. *gigantea. Kön. Mss.*

*Pedicels* naked; *male spikes* drooping with flowers, three-fold, the middle one pedicelled; *female corol* six-valved, *seeds* ovate.

*Beng.* Danga gurgur.

Perennial. It grows chiefly in the valleys amongst the Circar mountains and in Bengal.

*Culm* erect, ramous to the top, round, smooth, jointed, from eight to fifteen feet high, and as thick as a man's thumb at the base. *Leaves* from two to four feet long, and about one inch broad; the upper side and margins backwardly hispid. *Sheaths* short, and smooth. *Spikes* as in the last species. *Spathes*, *common*, of the peduncles, as in the last; *proper*, of the pedicels wanting. *Pedicels* long, filiform, naked, not jointed as in the last species. MALE FLOWERS above the female, as in the last, but here they are more numerous, and three-fold; the two lateral ones sessile, and the middle one pedicelled, they are closely imbricated round the whole of the spike. *Calyx* and *corol* as in the genus. FEMALE FLOWERS single as in the last species. *Involucre* ovate, entire round the circumference, perforated at the apex for the pedicel of the male spike to pass through; like the others it is smooth, glossy, and becomes exceedingly hard within the involucre; on each

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side of the male pedicel there is a compressed clubbed pedicel, each elevating the rudiment of a corollet; between them and the involucre is the small valvelet of what I call the calyx. *Calyx* common to the above-mentioned clubbed pedicels and the proper female flowers, two-valved; the large one ovate, pointed, embracing entirely the proper flower. *Corol* in general six-valved, four on one side, and two on the other, diminishing in size gradually. *Germ* ovate. *Style* two-cleft, as in the genus.

4. C. *aquatica. R.*

Floating and creeping from fifty to one hundred feet. *Leaves* linear, most acute, with hispid margins. *Male spikes* drooping, many-flowered; *flowers* three-fold, the middle one pedicelled. *Female corol* from six to seven-valved. *Seeds* turbinate.

A native of the lower parts of Bengal, where it is generally found floating on lakes, and along their margins to a very great extent.

*Roots*, beside the original ones there are many issuing from the joints of the old stems. *Stems* perennial, jointed, round, smooth, filled with pith, about as thick as a man's forefinger, floating on lakes or creeping along their margins to a great extent; extreme shoots as well as those from the joints arising in an oblique direction to the height of from four to five feet above the surface of the water, and bearing the leaves and flowers. *Leaves*, the lower ones linear-lanceolate, the superior ones ensiform, all have long, tapering, very acute points, with the margins hispid, from one to three feet long, and about the middle, where broadest, from an inch to an inch and a half wide. *Spikes* terminal, and from the exterior axills, peduncled, solitary or in pairs, drooping. FEMALE FLOWERS generally solitary on the base of the male spikes. *Involucre* turbinate, perforated; *calyx* and *corol*, *i. e.* glumes, within the involucre, from six to seven-valved, with two abortive corollets and their common valve, as in C. *gigantea*.



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*Germ* oblong, round it are three short, abortive stamina. *Style* two-cleft. MALE FLOWERS three-fold, the two lateral ones sessile, the middle one pedicelled, all have a two-valved *calyx* with two-valved flowers in each. *Seed* turbinate, smooth, of a dull pearl colour, the size of a pea.

5. C. *heteroclita. R.*

Erect, ramous, hairy. *Spikes* terminal, single, or paired, when two one is male, the other androgynous, with a jointed rachis and the five or six female flowers thereof bracted.

A native of the eastern parts of Bengal, where it flowers and ripens its seed toward the close of the rains. It is the smallest of the five species, being only about two, or at most three feet high, but very ramous.

6. C. *pumila. R.*

*Leaves* bifarious, linear-lanceolar, smooth. *Peduncle* terminal, naked, and not jointed. *Male spikes* with from three to four pairs of flowers; *female corol* five-valved, ovate.

Introduced from the Mauritius into the Botanic garden where it grows to be about eighteen inches high, every part smooth, leaves nearly as long as the culms.

*CAREX. Schreb. gen. N.* 1407.

*Ament* imbricated on all sides, with one-flowered scales. *Corol* none. *Male calyx*, the superior scales of the ament. *Corol* none. *Female calyx*, the inferior scales of the ament. *Corol* flask-shaped, permanent, one-flowered. *Stigma* from two to three. *Seed* solitary, three-sided, enclosed in the permanent corol.

1. C. *Bengalensis. R.*

*Spikes* sessile, androgynous, below female. *Panicles* axillary, and terminal, long-peduncled, ovate, dense; *scales* ovate, acute; *seed* three-cornered, within the ribbed, permanent, flask-shaped corol.

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A native of Silhet, and the only species I have ever met with in India. The culms are long, slender, smooth, and three-sided, leaves very long and slender with a sheathing tubular base.

*SCLERIA. Schreb. gen. N.* 1408.

*Male spikelets* imbricated, many-flowered. *Female flowers* solitary, or with one or two male ones in the same two to six-valved calyx. *Corol* three-parted. *Seed* or *nut* globular.

1. S. *biflora. R.*

*Culm* three-sided, leafly. *Leaves* ensiform, smooth. *Panicles* axillary and terminal, contracted. *Flowers* of both six-pedicelled. *Female calyx* two-flowered, one of them male.

A native of Bengal. Flowers during the rains.

*Root* of numerous, rust-coloured fibres. *Culms* from one to two feet long, leafy, smooth, three-sided with the angles sharp. *Leaves* very numerous, shorter than the culms, sheathing, sword-shaped, much keeled, smooth. *Panicles* axillary and terminal, small. *Male spikelets* short-pedicelled, oblong, imbricated with oblong concave scales, the lower two or three abortive, and may be called a common calyx; the rest containing three stamens each; beside these there are some others which embrace the base of each pedicel like the *perechetium* of *Hypnum*. *Filaments* permanent, forming a pencil from the spires of the spikelets. *Anthers* linear, incumbent, caducous. FEMALE FLOWERS short-pedicelled, with scales at the base of the pedicels as in the male. *Calyx* three-valved, two-flowered, one of which is a small male corollet with a two-valved corol, and three stamens. *Corol* of the female flower, small, three-parted; *divisions* acute. *Germ* round. *Style* single. *Stigmas* three. *Pericarp; nut* globular, wrinkled, villous. *Seed* solitary, in the cavity of the nut.

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2. S. *lithosperma. Willd.* iv. 316.

*Culm* three-sided, leafy. *Leaves* with hispid margins. *Panicles* axillary and terminal, patent. *Male* and *female spikes* distinct and sessile. *Female flowers* with the rudiments of one or two male corollets. *Seed* round, ovate, dotted.

Carex *lithosperma. Linn.*

Kaden-pullu. *Rheed. Mal.* xii. *t.* 48.

*Teling.* Konda-shaka-tonga.

A native of the valleys amongst the mountains of Coromandel.

3. S. *tenuis. Willd.* iv. 316.

*Culms* slender, acutely three-angled, smooth. *Leaves* long, slender and smooth. *Panicles* slender. *Flowers* in remote fascicles. *Seed* obovate, obsoletely three-sided, polished, white.

A native of the Moluccas, from two to three feet high, long and simple, the axillary panicles excepted.

4. S. *lævis. Willd.* iv. 314.

*Culms* erect, three-sided, smooth. *Leaves* slender and smooth. *Panicles* oblong, divided by various sized involucres. *Female flowers* sessile. *Seed* oblately spheroidical, even and polished.

A native of the Malay Archipelago.

5. S. *corymbosa. R.*

*Culms* erect, from four to five feet high, three-sided, smooth, leafy. *Leaves* smooth, three-nerved. *Corymbs* axillary, compound. *Seeds* ovate, somewhat acute, shining, white, obscurely three-cornered.

A native of the moist valleys of Chittagong, where it grows to the height of from four to six feet. Stout in proportion, smooth in every part, and replete with very long linear leaves, the uppermost two feet floriferous.

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6. S. *setigera. R.*

*Culms* erect, from four to five feet high, three-sided, crowded with long, tapering, smooth, three-nerved leaves. *Panicles* terminal, and from the exterior axills, oblong, under each ramification a long filiform bristle-like bracte.

A native of Chittagong.

*TRAGIA. Schreb. gen. N.* 1410.

*Male calyx* three-parted. *Corol* none. *Female calyx* six-leaved. *Corol* none. *Capsule* tricoccus.

1. T. *cannabina. Willd.* iv. 326.

Shrubby, twining. *Leaves* hastate, three-lobed, serrate. *Female calyx* pinnatifid.

Croton *hastatum. Syst. Veg.* But I strongly suspect Burman's figure which he has given for C. *hastatum* is a *mistake.*

*Teling.* Doolya-gunda.

This species is perennial, from three to four feet high, a native of dry barren ground about Samulkota. It flowers all the year round.

*Stem* scarcely any, what there is, is erect, and woody. *Branches* numerous; the larger ones woody, smooth; the smaller ones twining and hairy. *Leaves* alternate, petioled, three-parted, serrate, hairy; from two to four inches long. *Stipules* half lanceolate. *Racemes* leaf-opposed, peduncled, erect, many-flowered. MALE FLOWERS numerous, round the upper part of the raceme, very small, yellow, each three-bracted. *Filaments* half the length of the calyx. *Anthers* two-lobed. FEMALE FLOWERS below the male, generally two on each raceme. *Calyx* six-leaved; *leaflets* pinnatifid, hairy.

The hair of this plant stings fully as bad as the common nettle. Cattle do not eat any part of it.

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2. T. *involucrata. Willd.* iv. 324.

Shrubby, twining. *Leaves* oblong, three-nerved, serrate. *Female calyx* pinnatifid.

Schorigenam. *Rheed. Mal.* ii. *t.* 39.

*Beng.* Bichitee.

Ricinocarpus Zeylanica hirsuta. *Burm. Zeyl. t.* 92.

A perennial twining plant, a native of shady places, hedges, &c. where the soil is good. Flowers during most part of the year.

*Stem* short, woody. *Branches* twining, the tender parts covered with much hair. *Leaves* scattered, petioled, oblong, three-nerved, pointed, serrate, hairy. *Stipules* cordate. *Racemes* as in *cannabina*, but smaller, and seldom more than one female flower on each. *Bractes* and *flowers* both male and female, as in *cannabina*.

*Note.* The hairs of this plant sting equally as much as the former, nor will cattle eat it.

I have not observed any other in India, to compare with Willdenow's *cordata*, and *hispida*, they are probably the same, or only varieties of one species.

3. T. *Mercurialis. Willd.* iv. 324.

Annual, erect, ramous. *Leaves* ovate cordate, serrate. *Racemes* drooping. Inner three leaflets of the female calyx filiform.

Pee cupameni. *Rheed. Mal.* x. *t.* 82.

A small annual plant, it is much like *Acalypha indica*, appearing in flower during the hot season.

*Stem* erect, branchy, smooth, about a foot high. *Leaves* alternate, petioled, from cordate to oblong-ovate, serrate, smooth, from one to two and a half inches long, and one to two broad. *Petioles* shorter than the leaves, channelled. *Racemes* axillary, solitary, as long or longer than the leaves, filiform, bowing, few-flowered. *Bractes* remote, solitary, each embracing one, long-pedicelled, female flower, and several short pedicelled male ones. MALE FLOWERS. *Calyx*

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three-leaved, oval, pointed. *Filaments* shorter than the calyx. *Anthers* two-lobed. FEMALE FLOWERS. *Calyx* six-leaved; the exterior ones oblong, pointed, concave; the three interior ones linear, obtuse. *Germ* three-lobed. *Style* scarcely any. *Stigma* three-cleft, spreading. *Capsule* three-celled, six-leaved, the axills without dots at the base.

4. T. *Chamælea. Willd.* iv. 326.

Erect, slender, smooth. *Leaves* linear.

Chamaelea foliis linearibus. *Burm. Zeyl. t.* 25.

Codi avanacu. *Rheed. Mal.* ii. *t.* 34.

A native of Coromandel, and Malabar, on shaded pasture land.

*HERNANDIA. Schreb. gen. N.* 1411.

*Male calyx* none. *Corol* six-petalled. *Female calyx* cup-shaped, entire. *Corol* from six to eight-petalled. *Germ* one-celled, one-seeded; *attachment* superior. *Nut* superior, clothed with the inflated calyx. *Seed* globular. *Embryo* inverse, without perisperm.

H. *Ovigera. Gært. Sem.* i. 193. *t.* 40. *f.* 3.

Arboreous. *Leaves* peltate, cordate, shining, entire. *Panicles* axillary.

Arbor ovigera. *Rumph. Amb.* iii. *t.* 123. In this figure the fruit is something like, but the leaves and general habit very unlike. The same author's Arbor Regis, H. *Sonora*, *vol.* ii. *p.* 257. *t.* 85. is good for the leaves of that species, but nothing like the fruit.

A native of the Moluccas, and from thence introduced into the Botanic garden in 1798. In twelve years the trees were from twenty to thirty feet high, with a straight, smooth trunk, and incurved branches. The young shoots of a deep lucid green.

*Leaves* alternate, petioled, peltate, cordate, entire, smooth,



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of a shining, deep green on both sides, from five to six inches long, by four or five broad. *Petioles* nearly as long as the leaves, round, smooth. *Stipules* none. *Panicles* axillary, corymbiform, longer than the petioles, all the divisions smooth, lucid green. *Flowers* numerous, small, white. *Bractes*, exclusive of the involucres, oblong, one at each division of the panicle. *Involucre* four-leaved, three-flowered, viz. two male and one female, oblong, expanding. MALE. *Perianth* none. *Corol* six-petalled; the exterior one rather longer than the inner one. *Nectary*, six elevated glands, alternate with the stamens. *Filaments* three, incurved, sub-clavate, shorter than the petals. *Anthers* a large groove on each side of the apex of the thickened filament. FEMALE shorter pedicelled than the male. *Perianth* beneath cup-shaped, with an entire mouth. *Corol* superior, petals eight, the inner four smaller, all inserted on the apex of the germ. *Nectary* four yellow glands, alternate with the four inner petals. *Germ* the perianth, but under the corol, oval, one-celled, containing one ovulum, attached to the top of the cell. *Style* shorter than the petals. *Stigma* large, with a spreading lobed margin.

For the fruit see Gærtner's work above quoted, where the description and figures are both very accurate.

## MONOECIA TETRANDRIA.

### *SERPICULA. Schreb. gen. N.* 1413.

*Male calyx* four-toothed. *Corol* four-petalled. *Female calyx* four-parted. *Pericarp* a downy nut.

S. *verticillata. Willd.* iv. 329. *Corom. pl.* ii. *N.* 164.

Dioecous, ramous. *Flowers* triandrous. *Leaves* verticelled.

Hottonia serrata. *Willd.* i. 314.

*Teling.* Poo-natsoo.

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It grows in clear, standing, sweet water, and produces its flowers during the cold season. It consists of simple, filiform roots, and a number of fine, filiform, jointed shoots, or stems, some creeping, some floating below the surface of the water.

*Branches* solitary, axillary. *Leaves* sessile, verticelled, (from three to six-fold) oblong-lanceolate, or linear-lanceolate; from one-eighth to half an inch long. MALE FLOWERS axillary, sessile, from one to four in the verticel, much smaller than the female. *Calyx; spathe* one-flowered, sub-globular, murexed, bursting irregularly. *Perianth* three-leaved. *Leaflets* obovate, reflexed. *Corol* three-petalled; *petals* wedge-formed, reflexed. *Filaments* three, short, ascending. *Anthers* very large, two-lobed, opening with an elastic jerk; pollen white, very large grained. FEMALE FLOWERS in a distinct plant, axillary, generally solitary, though sometimes there are two from the same verticel. *Spathe, perianth,* and *corol* as in the genus. No nectary. *Germ* sessile, subulate, ending in the long, sub-erect receptacle of the flower, which elevates it above the water while expanded. *Stigmas* three, lanceolate. The *capsule* has the appearance of a siliqua, subulate, sometimes murexed, one-celled. *Seeds* from three to five, oblong, pointed at each end, lodged as in the leguminous plants, their attachments I could not discover.

*Note.* When the male flowers are ready to expand, the murexed spathe bursts, the flowers are then quickly detached, and swim remote from the parent plant, on the surface of the water, in search of the female flowers; resting on the extremities of the reflexed leaflets of the perianth and petals of the corol. What a wonderful economy!

The Berhampore sugar refiners use this part while moist, to cover the surface of this sugars, as clay is used in the West India Islands, and in two or three days, the operation is finished exceedingly well.



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*ALNUS. Schreb. gen. N.* 1419.

*Male calyx* the scales of the ament, three-flowered. *Corol* from three to four-parted. *Female calyx* the scales of the ament, two-flowered. *Corol* none. *Styles* two. *Nut* compressed, two-celled.

1. A. *glutinosa. Willd.* iv. 334.

*Male peduncles* branched. *Leaves* roundish-obovate, serrulate, some obtuse, some pointed; *veins* glutinous, and their axills villous underneath. *Stipules* lanceolate oblong.

Found by Colonel Hardwicke, on his tour to Shreenagur. See *Asiat. Res.* vi. *p.* 373.

2. A. *dioeca. R.*

*Leaves* oblong, polished, entire, obtuse pointed, axills of the veins naked. *Male aments* sessile, cylindric. *Stipules* falcate, lanceolate.

Kokra the vernacular name at Silhet, where the tree is indigenous, and grows to be of considerable size; its timber very hard, and used for various economical purposes. The tree flowers in March, and the seed ripens about the beginning of the cool season.

*Young branchlets* smooth, much divided. *Leaves* alternate, short-petioled, oblong, entire, obtuse pointed, of a firm texture, and very smooth; from three to six inches long, and from two to two and a half broad. *Stipules* falcate-lanceolate, ciliate. MALE AMENTS axillary, several together, sessile, cylindric, about an inch long. *Scales* reniform, ciliate, concave, from three to four-flowered. *Calyx* four-parted. *Corol* none. *Filaments* four, arising from the base of the segments of the calyx, and of their length. *Anthers* two-lobed. *Germ* a small sub-cylindric, villous gland in its place. FEMALE AMENTS on a separate tree; axillary and lateral below the leaves, solitary, sessile, sub-globular, few-flowered. *Scales* of the ament, and calyx as in the male. *Corol* none. *Sta-*

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*mina* none. *Germ* superior, oblong, hairy, two-celled, with two ovula in each, attached to the top of the partition. *Style* scarcely any. *Stigma* of four, brown, glandular, recurved lobes. *Capsule* nearly round, the size of a black currant, pretty smooth, olive-coloured, two-celled, four-valved. *Valves* composed of two coats, the exterior one friable, the inner one thin and tough like parchment, its incurved edges forming the partition. *Seeds* generally single, though sometimes two, integuments three, the exterior one succulent and orange-coloured, the second thin, firm, and white like parchment, and the inner one membranaceous. *Perisperm* conform to the seed, white. *Embryo* green, inverse. *Cotyledons* obovate. *Radicle* superior.

### *URTICA. Schreb. gen. N.* 1422.

*Male calyx* four-leaved. *Corol* none. *Female calyx* one-leaved, or two-valved. *Corol* none. *Seed* solitary.

1. U. *scabrella. R.*

Shrubby, spreading. *Leaves* opposite, cordate, serrate, harsh, three-nerved. *Spikes* axillary, erect, cylindric; the *male* ones crowded, short, and in the lower axills; the *female* ones above and generally solitary.

A native of Chittagong, where it is common, but so far as I know, applied to no useful purpose; nor does it sting, though harsh to the feel. It flowers about the end of the rains, and the seed ripens in the cool season.

2. U. *parviflora. Roxb.*

Dioecous, herbaceous, erect, armed with numerous strong, harsh, pellucid, stinging bristles. *Leaves* opposite, ovate, lanceolate, serrate. *Stipules* undivided. *Female spikes* quatern, compound, glomerate.

A native of Rohilcund. In the Botanic garden where it was introduced in 1803, it blossoms in March, and April, but has

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not ripened its seed, owing, I presume, to our plant, so far as I have been able to observe, bearing only female flowers.

*Root* ramous, perennial. *Stems* herbaceous, erect, about three feet high, and with but few branches, four grooved on the sides, with but few angles rounded, and every part armed with numerous, strong, very sharp, clear, stinging bristles. *Leaves* opposite, petioled, ovate, and ovate lanceolate, grossly serrate, wrinkled, about three inches long, by one broad. *Petioles* scarcely half the length of the leaves, armed. *Stipules* opposite, entire, oblong, conic. FEMALE FLOWERS. *Panicles* quatern, that is, two in each axill, as in U. *dioeca*, which it most resembles. *Flowers* very minute, green. *Calyx* of two opposite pairs of oval leaflets. *Stamina* none. *Germ* oval. *Style* none. *Stigma* a pencil of white hairs.

3. U. *trinervia. R.*

Shrubby. *Leaves* opposite, broad-lanceolate, crenate, distinctly three-nerved to the apex, panicles axillary, the length of the petioles.

A native of Chittagong, where it blossoms in April.

4. U. *alienata. Syst. Veg.* 709.

Annual, erect while young; *branches* brachiate. *Leaves* opposite, petioled, ovate, three-nerved, entire. *Flowers* axillary, sessile, female calyx urceolate.

Boehmeria alienata. *Willd.* iv. 341.

Parieteria Zeylanica. *Linn. Sp.* 1492.

Parieteria Cochin-chinensis. *Lour. Cochin Ch.* 456.

A native of Ceylon, and introduced by General Macdowall into the Botanic garden where it blossoms during the rains.

*Root* ramous, annual. *Stem* erect, nearly round, somewhat scabrous. *Branches* from two to three pairs, decussate, height of the whole plant from six to twelve inches. *Leaves* opposite, petioled, ovate, three-nerved, entire, somewhat scabrous underneath, length from one to two inches. *Stipules* two on each side, acute and slender. *Flowers* axillary, ses-

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sile, several female with one or two male ones, both sorts are very small. *Male calyx* to the base four-cleft. *Female* urceolate, from eight to ten-ribbed. *Seed* ovate, acute. *Calyx* smooth, shining, of a chesnut colour, with a white base.

5. U. *tuberosa. R.*

*Root* tuberous. *Leaves* alternate, oblong, three-nerved, hairy. *Flowers* axillary, sessile; *seed* much pointed.

Herba memoria. *Rumph. Amb.* vi. *t.* 12. *f.* 2.

Is exceedingly like old plants of U. *alienata;* and young plants of this are very like *Parieteria officinalis.*

*Teling.* Pilli-dumpa.

A native of the banks of water courses, hedges, &c. where it meets with a good soil, and shady situation. It flowers during the wet and cold seasons.

*Root* perennial, tuberous, spindle-formed, perpendicular. *Stems* or *branches* several, annual, from one to six feet long, flaccid, resting on the ground, or bushes; striated, a little hairy. *Leaves* spreading, petioled; on the lower part of the primitive stem opposite, larger, and much broader in proportion, than on the branches, where they are alternate, pointed, entire, three-nerved and hairy, from one to three inches long, and broad in proportion. *Flowers* axillary, sessile, crowded. *Male* and *female* mixed, very small. MALE. *Nectary* a pedicelled gland in the centre; the rest as in the genus. FEMALE. *Calyx* one-leaved, gibbous, mouth contracted, and slightly notched. *Style* long, hairy. *Stigma* acute. *Seed* ovate, acute.

The roots are esculent, and nutritious; the natives eat them raw, boiled, or roasted.

6. U. *pentandra. Roxb.*

Perennial, diffuse. *Leaves* opposite, and alternate, subsessile, linear, small, three-nerved. *Flowers* axillary, pentandrous; the *male* ones peduncled; the *female* ones sessile, with calyx winged.

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*Hind.* Pippira-Saree.

Is found about Calcutta, growing among bushes in wet places; flowers during the rains.

*Root* of capillary fibres. *Stem* long and slender, resting on the earth, and rooting; above erect, seemingly perennial, round, smooth, the inferior branches opposite, and cross-armed, the superior ones flower-bearing, alternate. *Leaves* the inferior ones opposite, somewhat petioled, and larger, the upper ones smaller, alternate, and sessile, all linear-lanceolate, three-nerved, somewhat scabrous, serrate; size very various; about four inches long. *Flowers* axillary, two female ones generally placed on the outsides and sessile, while several peduncled male ones occupy the centre, and expand in succession. The MALE FLOWERS before they expand appear like a most regular, five-sided, half-excavated cup, with a beautiful, fringed, scolloped margin. *Calyx* five-leaved. *Corol* none. *Nectary* none. *Stamens* five, flying open with a remarkably smart jerk. FEMALE FLOWERS. *Calyx*, I cannot separate it from the germ. *Germ* obcordate, compressed, two-winged, with an elevated ridged appendix on the inside. *Style* villous. *Seed* ovate, lanceolate, acute, smooth, base white, upper part brownish black.

7. U. *suffruticosa. R.*

Suffruticose. *Leaves* alternate, lanceolate, broadest at the base, entire, three-nerved, smooth. *Flowers* axillary, crowded, sub-sessile. *Female calyx* one-leaved, ribbed, mouth bidentate.

From Sumatra, this perennial, somewhat shrubby plant, was introduced into the Botanic garden at Calcutta in 1803, where it is in constant flower and seed the whole year.

*Root* fibrous. *Stem* short, somewhat ligneous, soon dividing into many diffuse, and erect, round branches and branchlets, covered with coloured bark, over which are many short, appressed, white hairs, the whole extent of the longest of our young plants about two feet. *Leaves* scattered, short-peti-

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oled, drooping, from ovate-lanceolate below, to linear-lanceolate above, three-nerved, the upper surface smooth, and somewhat lucid; plain underneath, and somewhat hairy, particularly the nerves; general length about two inches, and half an inch broad. *Stipules* paired, conic, acute, embracing the little bundles of flowers. *Flowers*, male and female crowded in the same axill, sub-sessile, small, of a greenish yellow. *Female calyx* one-leaved, with a contracted, bidentate mouth; and the outside deeply ribbed and hairy. *Seed* ovate, acute, polished, of a dark brownish black.

8. U. *minima. R.*

Annual, diffuse. *Leaves* alternate, ovate, deeply crenate. *Flowers* in terminal, compound, peduncled fascicles; *female flowers* numerous, with a two-leaved calyx.

A native of the Island of Honimoa, and far the smallest of the genus I have yet met with, its greatest extent being only over a space of from four to five inches.

9. U. *interrupta. Linn.*

Annual, erect, bristly. *Leaves* cordate, serrate. *Racemes* compound; *partial racemes* corymbed. *Stipules* solitary, two-cleft. *Seeds* compressed, obliquely cordate.

Batti scorigenam. *Rheed. Mal.* ii. *t.* 40.

*Beng.* and *Hind.* Lall bichiti.

*Boehmeria interrupta. Willd.* iv. 342.

A large annual found wild near Calcutta; flowering time the rainy season.

*Root* ramous, annual. *Stem* erect, flexuous, furrowed, bristly, from two to four feet high; *branches* axillary, like the stem. *Leaves* alternate, petioled, deeply serrate, three-nerved, besprinkled with a few small bristles, particularly the coloured nerves and larger veins; from two to six inches long, and nearly as broad. *Petioles* as long as the leaves, coloured, round, bristly. *Stipules* axillary, solitary, half two-cleft; *divisions* subulate, fringed. *Racemes* axillary, solita-



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ry, erect, from six to twelve inches long, composed of remote, twice two-cleft, recurved corymbs. MALE FLOWERS few. *Calyx*, &c. as in the genus. FEMALE FLOWERS numerous. *Calyx* one-leaved, of an oblique, cup-form, compressed, mouth four-toothed. *Pistillum* half immersed in the calyx, obliquely ovate. *Seed* compressed, cordate, sitting on the mouth of the now totally reflexed calyx, and covered with a yellowish, fleshy, rugose integument, which adheres to, and drops with it.

The hairs of this plant sting like the common nettle.

10. U. *heterophylla. Willd.* iv. 362.

Annual. *Leaves* alternate, cordate, variously lobate, grossly serrate. *Male* and *female flowers* on distinct, glomerate, peduncled spikes; every part armed with stiff, acute, burning bristles.

Ana schorigenam. *Rheed. Mal.* ii. *p.* 77. *t.* 41.

A native of the mountains of Malabar, from thence the seeds were sent by Dr. Buchanan, to the Botanic garden at Calcutta, where the plants blossom and ripen their seed during the cold season; soon after which they perish.

*Root* annual, ramous. *Stem* erect, flexuose, angular, with small white specks, in which are inserted stiff most acute bristles, pointing rigidly in every direction; *branches* as cending, and like the stem. *Leaves* alternate, long-petioled, cordate, lobate, towards the top of the plant almost palmate, all are grossly serrate, armed with the same bristles as the stem and branches, and some harsh pubescence beside; from four to eight inches long, breadth nearly the same. *Petioles* about half the length of the leaves, channelled and armed. *Stipules* large, axillary, solitary, cordate, with the apex ending in one or two acute points. *Peduncles* axillary, the lower supporting the male, sub-cylindric, amentaceous flowers; those towards the apex of the plant, the female ones, in large, glomerate, variously divided spikes. *Male flowers* as in the genus. *Female* with a cymbiform, tridentate calyx.

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This is the most ferocious looking plant I have seen, and it acts up to its appearance; the least touch of any part produces most acute pain, but fortunately of short duration. The bark abounds in fine, white, glossy, silk-like, strong fibres.

11. U. *vescicaria. Roxb.*

Shrubby, erect. *Leaves* alternate, broad-lanceolate, three-nerved, entire, downy. *Flowers* axillary, crowded, sessile. *Female calyx* with an inflated swelling round the base.

A shrubby species, a native of the Circar mountains. Flowering and seed time the wet season.

*Stems* or *branches* several, perennial, somewhat shrubby, from four to six feet high, erect, round, somewhat winding. *Bark* of the woody parts smooth, ash-coloured, that of the young shoots hairy. *Leaves* alternate, spreading, petioled, broad-lanceolate, entire, downy, three-nerved; from two to three inches long, and about one broad. *Stipules* semi-lanceolate, caducous. *Flowers* axillary, sessile, crowded; *male* and *female* mixed. *Male calyx* four-parted. *Nectarial glands* ovate, small. *Female calyx* as in U. *tuberosa*, round its base on the outside are, from five to six or seven small, obovate, inflated, permanent vescicles. *Style, stigma* and *seed*, as in *tuberosa.*

12. U. *decumana. Rumph. Amb.* vi. *t.* 20. *f.* 1.

Shrubby. *Leaves* alternate, cordate, serrate, rugose, bristly. *Female spikes* composed of alternate, bifarious ramifications.

*Mal.* Daun Gattal.

Introduced from the Moluccas, into the garden at Calcutta in 1802. In April 1803 one plant blossomed. It had only a short ligneous stem, covered with smooth, ash-coloured bark, and some few short, young, round, bristly branches arising therefrom.

*Leaves* alternate, petioled, cordate, serrate, very rugose, both sides armed with clear, sharp, stinging bristlets, about



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six inches long, by three broad. *Petioles* rather short, somewhat channelled, bristly. *Stipules* solitary, interfoliaceous. *Female spikes* axillary, solitary, compound, expanding, larger than the leaves, their branches alternate, bifarious, and composed of minute alternate branchlets, all round, deeply coloured, and bristly. *Female flowers* numerous, sessile, intermixed among small coloured, bristly bractes. *Calyx* four-leaved. *Corol* none. *Stamina* none. *Germ* ovate. *Style* and *stigma* single, and villous. *Seed* solitary, compressed.

13. U. *pulcherrima. R.*

Dioecous, shrubby. *Leaves* alternate, lanceolate, serrate, three-nerved, veins reticulate; underneath hoary and pitted. *Spikes* axillary, paired, compound, glomerate, recurved. *male flowers* pentandrous.

A most beautiful shrub, a native of Chittagong; flowering during the rains; the seed ripens in the cool season.

*Stem* as thick as a man's leg, very short, but straight. *Branches* numerous, spreading in every direction round the stem. *Bark* of the old woody parts brown, and pretty smooth; that of the young, coloured shoots angular, and clothed with short appressed hairs. *Leaves* alternate, rather long-petioled, exactly narrow-lanceolar, beautifully serrate, long, tapering, acute-pointed, three-nerved, with elevations on the upper surface corresponding with the pits below, which render them rough though lucid, about six inches long, by one broad. *Veins* diverging and reticulate, hoary underneath, and there parted round the margin, and slightly in the middle of the space between the nerves. *Petioles* from one to two inches long, a little hairy, coloured and channelled. *Stipules* axillary, small, scariose. *Male calyx* in axillary pairs, recurved in opposite directions, compound, glomerate. *Calyx* five-leaved. *Stamina* five. *Female spikes* on a different plant and like the male. *Calyx* of one, two-lobed, bivalvular-like, ciliate leaflet. *Germ* oval. *Style* none. *Stamina* a villous tuft.

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14. U. *frutescens. Thunb. Juss.* 70.

Shrubby. *Leaves* alternate, short-petioled, lanceolate, cuspidate, three-nerved, with the interior margins serrulate, hoary underneath, harsh above. *Heads* axillary, peduncled.

Boehmeria *fructescens. Willd.* iv. 343.

A native of the mountains north of Bengal, and Oude, as well as of Japan.

15. U. *bicolor. R.*

Shrubby. *Leaves* alternate, short-petioled, lanceolate, serrate, three-nerved, scabrous above, hoary underneath. *Heads* axillary, sessile.

A native of the mountains of Bareilly.

16. U. *Sphaerocephala. R.*

Shrubby. *Leaves* alternate, petioled, oblong, toward the apex serrulate, strongly marked with three equal nerves, scabrous above, hoary, except the veins and nerves, underneath. *Heads* axillary, peduncled, spherical, crowded with male and female flowers mixed.

17. U. *paniculata. R.*

Shrubby. *Leaves* alternate, cordate, serrate, acute, three-nerved, reticulated, rough above, and soft with white down underneath. *Stipules* in opposite pairs, ensiform. *Panicles* axillary, short and crowded.

A native of the Moluccas; with the foliage of U. *decumana*, but a very different inflorescence. The calyx of the female flowers in that is three or four-leaved; in this a five-toothed cup.

18. U. *lineata. R.*

*Leaves* alternate, petioled, oblong, entire, smooth, marked with parallel simple veins. *Stipules* solitary, spathiform. *Panicles* axillary, the length of the petioles, dichotomous. *Female calyx* unequally four-parted.

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A native of the Moluccas, where it grows to be a large straggling shrub, with leaves from six to twelve or more inches long. Panicles composed of numerous alternate incurved divisions, crowded with innumerable, sessile, female flowers on their opposite margins only.

19. U. *tenacissima. R.*

Shrubby, erect, ramous. *Leaves* alternate, long-petioled, broad-cordate, grossly serrate, hoary underneath. *Panicles* axillary. *Flowers* in round fascicles; the male ones on the lower panicles and the female ones above.

Caloose. *Marsden's Sumatra. p.* 57.

Rami, the Malay name in the Island of Pulo Pinang.

A native of the Island of Sumatra, where it is cultivated for its bark, which abounds in fibres of very great strength and fineness. In the Botanic garden where it has lately been introduced, with the view of obtaining its valuable fibres, it grows very luxuriantly, and blossoms about the close of the rainy season. We have now had it five years in the garden, the roots of the original plants, as well as of their progeny, are becoming daily extended, and continue healthy and vigorous, throwing up numerous shoots, as often as they are cut down for the fibres of their bark, which may be done about four or even five times every year, if the soil is good and care taken of the plants, viz. if kept clean of weeds, and watered when the weather is so dry as for the soil to require irrigation, and carefully drained when too wet.

The plant is as readily cultivated from cuttings, as the Willow, which is fortunate, as I have never yet found it produce fertile seed.

*Stems*, when suffered to remain, they become stout, and ligneous, and then covered with brown, somewhat scabrous bark. *Branches* many, spreading considerably, the ligneous parts with bark like the stems; the tender parts hairy. *Leaves* alternate, long-petioled, cordate, hairy, and a little hoary underneath, three-nerved; about six inches long, by four broad.

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*Stipules* ensiform, one on each side of the insertion of the petiole. *Panicles* in axillary pairs, about as long as the petioles, villous. *Flowers* numerous, small, of a greenish yellow, collected in small, globular heads; male on the inferior panicles, and female on the superior ones. *Bractes* minute. MALE. *Calyx* of four ovate, concave leaflets. *Corol* none. *Nectary* a globular pedicelled gland in the centre resembling a pistillum. *Filaments* four. *Authers* two-lobed. FEMALE. *Calyx* one-leaved, urceolate. *Corol* none. *Stamina* none. *Germ* oblong, minute, hairy, no filaments surrounding it, as in Louriero's U. *nivea*. *Stigma* single, hairy, and about the length of the germ. *Seeds*, they have not been found in a ripe state.

To procure the fibres, Marsden says the shoots are cut down, dried, and beaten, after which the rind is stripped off. Rumphius's *Ramium majus, Hor. Amb.* 215. *t.* 79. *f.* 1, which I take to be this plant, yields also fibres of the same nature, and is quoted by Willdenow for *Urtica*, which from the prevailing definition of that plant, "*Foliis sub-orbiculatis utrinque acutis, vel base attenuatis*," I must conclude to be a different species, for in all the plants in the Botanic garden, originally from Sumatra, from Prince of Wales' Island, and from Rungpoor, they are uniformly broad-cordate. Both male and female inflorescence glomerate, panicled. *Calyx* of the latter of one leaf, and the germ destitute of the barren filaments which Louriero gives to U. *nivea*.

20. U. *crenulata. R.*

Shrubby, dioecous, erect. *Leaves* alternate, oblong, acute, crenate. *Spikes* axillary, compound, dichotomous.

A native of the eastern parts of Bengal, and first found near Luckipore by Dr. Buchanan; flowering time the latter part of the rains.

*Stem* erect, shrubby. *Bark* smooth, ash-coloured, armed with most acute, burning hairs. *Leaves* alternate, short-petioled, oblong, acute, crenulate, or slightly dentate, both sides

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armed with a few burning white hairs. *Stipules* cordate, small, caducous. FEMALE.* *Spikes* axillary, solitary, dichotomous, with alternate lateral divisions. *Flowers* numerous, all female. *Calyx* four-parted. *Germ* ovate, one-seeded. *Style* none. *Stigma* long, villous, fleshy and tapering.

21. U. *acuminata. R.*

Sub-arboreous, hairy. *Leaves* petioled, broad-lanceolar, entire, acuminate. *Female glomerules* axillary, small, globular; in short, once or twice-dichotomous peduncles.

A small, erect, ramous tree, with dusky bark and hairy branchlets, a native of the forests of Chittagong, where it flowers during the cool season.

22. U. *involucrata. R.*

Arboreous. *Leaves* alternate, broad-cordate, downy, subentire. *Stipules* opposite, subulate. *Peduncles* axillary, drooping, bearing a few female flowers in an involucred head.

A native of the Malay Islands. In the Botanic garden it is in blossom the whole year, but no male flowers have been found, nor do the seeds ripen.

23. U. *naucliflora. R.*

Dioecous, shrubby, twining. *Leaves* alternate, cordate, entire; *glomerules* globular, compact, the male ones panicled.

A large, scandent, woody plant, common in the forests of Chittagong, Silhet, and the eastern frontier of Bengal. In the former known by the vernacular name *Dolea Sat*, and in the latter *Luta Kudum*, *i. e.* scandent *Nauclea*. *Flowers* beautiful and fragrant, appearing at various times through the year, but ripening best about or before the beginning of the rains.

*Stem* and *large branches* stout and woody, covered with

* I have not yet met with the male.

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dark coloured, scabrous bark, the whole extending to a great length by twining up and over trees, &c. *Leaves* alternate, petioled, cordate, entire, smooth; from four to eight inches long, by from three to six broad. *Petioles* half the length of the leaves, round, coloured. *Stipules* axillary, solitary, large, ovate-oblong, smooth, of a deep dark ferruginous colour. MALE. *Panicles* from the old axills composed of numerous, small, globular heads of minute, very fragrant corollets. *Bractes* in fours, at the divisions of the panicle, oval, and oblong, coloured like the stipules. *Common perianth* none, or very obscure; *proper* one four-leaved; *leaflets*, oblong, concave, sub-cucullate over the anthers. *Corol* none. *Filaments* four, very broad, and short. *Anthers* cordate. *Germ* none, but a columnar, headed gland in its place. FEMALE on a different plant. *Peduncles* from the axills of the former leaves, as in the male, generally solitary, once or twice dichotomous, with a larger globular head of small, beautiful, purple, fragrant, pedicelled corollets on each division. *Bractes* as in the male. *Proper perianth* one-leaved, four-parted, segments often unequal. *Corol* none. *Stamina* none. *Germ* superior, oblong, one-celled, containing one ovulum attached to the bottom of the cell. *Style* short. *Stigma* lateral, oblong. *Pericarp* none, the remaining succulent calyx covering a single, oblong seed, which has, besides an exterior succulent envolope, a middle thin hard one, and an inner membranceous one. *Perisperm* while the seeds are recent there is a thin succulent one. *Embryo* inverse. *Cotyledons* two, oblong. *Radicle* cylindric, superior.

24. U. *globulifer. Roxb.*

Dioecous, shrubby, scandent. *Leaves* alternate, long-petioled, oblong, entire, villous. *Panicles* axillary; *glomerules* globular, compact, panicled.

Lal-Kudum, the vernacular name in Silhet, where the plants are found indigenous, climbing over trees and bushes. Flowering time February and March. The seeds are ripe



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about the beginning of the rains in June. This species much resembles U. *naucliflora*, but the leaves differ widely in shape; the female glomerules as well as the male ones are in crowded panicles, and all being void of fragrance, point them out very distinct species.

25. U. *inæqualifolia. R.*

Shrubby, erect, hispid. *Leaves* alternate, sessile, unequally falcate, lanceolate, entire, acuminate. *Glomerules* axillary.

A native of Chittagong, where it flowers in April.

*MORUS. Schreb. gen. N.* 1424.

*Male perianth* four-leaved. *Corol* none. *Female perianth* four-leaved. *Corol* none. *Germ* one-celled, one-seeded, superior. *Styles* two. *Calyx* becoming a berry. *Seed* one, in each acine. *Embryo* inverse and furnished with a perisperm.

1. M. *alba. Willd.* iv. 368.

*Leaves* cordate-serrate, without pubescence, some deeply and variously lobate, other almost palmate. *Fruit* ovate, oblong, white.

Found in gardens in several parts of India and varying so much by culture as to render it difficult to give a better definition than the above. It does not appear to be cultivated in every part of India for its leaves to feed silk-worms. The fruit rather small, juicy, but insipid.

In Bengal it blossoms about the end of the cold season, and the fruit ripens in about six weeks, or two months afterwards. It appears to be dioecous, for I have only met with female flowers on the plants cultivated in the Botanic garden at Calcutta.

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2. M. *atropurpurea. R.*

*Leaves* cordate, very rarely lobate, serrate, smooth. *Ament* cylindric. *Fruit* cylindric, dark purple.

M. *rubra. Lourier. Cochin Ch.* 679.

From China this large species was introduced into the Botanic garden at Calcutta, where it thrives luxuriantly, blossoms about the beginning of the hot season, in February, and the fruit ripens in March and April.

Attempts have been made to feed the silk-worm in Bengal with its leaves; but, so far as I can learn, with little or no success.

*Trunk* rarely more than a few feet in height, and in our young trees in Bengal from eighteen to twenty-four inches in circumference. *Bark* ash-coloured, and rather scabrous. *Branches* and *branchlets* nearly erect, long, simple, and pretty stout, bark of the old ligneous parts like that of the trunk; that on the younger branches more smooth, and lighter coloured; the general height of our largest trees about twenty feet. *Leaves* alternate, cordate, serrate, acuminate, smooth, three-nerved, with a gland on the base of the lateral nerves, about six inches long, by five broad, caducous during the cool season; and the new foliage begins to appear with the flowers in February. *Petioles* nearly round, smooth, an inch and a half long. *Stipules* ensiform, chaffy, caducous. *Aments* axillary, and below the first leaves of the tender shoots, peduncled, generally drooping. The male flowers on one tree and the female ones on another, though sometimes they are monoecous, or polygamous. MALE. *Aments* cylindric, drooping. *Corollets* pedicelled. *Calyx* four-leaved, or deeply four-parted. *Corol* none. *Filaments* four, more than twice the length of the calyx. *Anthers* oval. *Germ* none, but a small conic gland in its place. FEMALE. *Aments* cylindric, drooping. *Corollets* sessile. *Calyx* four-leaved. *Leaflets* obovate, appressed to the germ. *Corol* none. *Stamina* none. *Germ* oval, one-celled, containing one ovulum attached to the top of the cell. *Styles* two, revolute, villous, rather united at



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the base. *Stigmas* simple, small. *Fruit* cylindrical, composed of numerous, ovate, acute, one-celled, nuciform capsules, enveloped in the enlarged, now succulent, dark purple calyx. *Seed* solitary, with scanty albumen, and embryo exactly as in M. *alba. Gært. Sem.* ii. 199. *t.* 126.

3. M. *serrata. R.*

Arboreous. *Leaves* evenly cordate, three-nerved, grossly and acutely serrate, cuspidate, rough, but void of pubescence. *Female aments* cylindric.

Heemoo of the natives about Dosa.

Found by Captain Hardwicke wild in the forests about Dosa, in his tour to Shreenagur. See *Asiat. Res.* vi. 373. *Morus. N.* 1.

It differs from all the species I have yet seen in the apices of the leaves being very long and sharp, and in most of the serratures being remarkably large and acute.

4. M. *Indica. Willd.* iv. 370.

Dioecous, sub-arboreous. *Leaves* ovate, cordate, long, taper-pointed, serrate, smooth. *Aments* oval. *Styles* single, half two-cleft.

Morus Indica, *Rumph. Amb.* vii. *t.* 5, is a pretty good figure of this; but *Tinda parua* of the *Hortus Malabaricus*, *vol.* i. *t.* 49, quoted for *Morus Indica*, is no doubt König's *Trophis aspera*, and a tolerably good representation it is.

*Beng.* Toot.

*Sans.* Toola.

I have never found this tree in its wild state, but always in gardens, or plantations, or where it had been planted. Where it is indigenous I cannot say. Flowering time the beginning of the hot weather, in February, at which time the young leaves also make their appearance, though by culture they may be continued the year round.

*Trunk*, when the trees are suffered to grow unmolested till they are full grown, rarely more than the thickness of a man's

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leg. *Branches* numerous, spreading in all directions. *Wood* pale, yellowish, hard, close-grained. *Bark* smooth, ash-coloured; the whole height of the largest trees I have seen about twenty feet. *Leaves* deciduous, alternate, petioled, ovate-cordate, long, tapering, entire, pointed, with the lateral margins serrate, and sometimes lobate and even deeply so, smooth on both sides, very various in size on the larger trees not kept cut, as in the plantations for feeding silk-worms, where they are larger and more divided, from two to four inches long, and from one to two and a half broad. *Stipules* sub-lanceolate, caducous. *Female aments* from the axills of the first leaves or from the scales of the envelope of the bud of the young shoots, solitary, short-peduncled, nearly oval, or oval. *Calyx* of four, fleshy, cuneate leaflets. *Style* single, half two-cleft; divisions tapering and villous. *Berry* about the size and shape of a small field bean; when ripe black.

This is the species cultivated in Bengal to feed silk-worms. It is kept down by frequent cutting that the branches may become more numerous, consequently the foliage more abundant, and more easily gathered. The cultivators of these bushes, do not always rear the worm. When they do not, they sell the leaves upon the tender branches to the ryots who rear the worm, but do not cultivate the mulberry, by the basket, a measure called in some parts a *Koopee*, weighing on an average, one hundred pounds avoirdupois. The average price is about three *Koopees* for the Rupee. While the worms are very young they not only strip the leaves from the twigs but cut them small. Afterwards when the worms are larger, the whole leaves upon the twigs are given, and the sticks are removed when the leaves are consumed.

The annual value of the biga which is a third of an English acre, taking the general average of markets, and also the general average of lands in point of quality of soil, may be about eight Rupees; deduct for the rent of the land two Rupees, this leaves a profit of six to the ryot for his labour.

The plant is usually cut four times in the year, and strip-

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ped of its leaves twice. The latter mode is practised during the rains, when cutting the plants would injure them, by the water penetrating the cut parts; besides, by having the branches at this season at their full length, there is less danger of their being overflowed during inundations of the Ganges.

A plantation once formed, requires no great labour to keep it in order, as the close luxuriant growth of the plants keeps the weeds pretty well under; however, it is necessary to dress the ground now and then, and to earth up the plants while young, or when the rain washes away the earth. The ground is generally so moist at all tines of the year in Bengal, as to render irrigation almost unnecessary; an advantage the coast of Coromandel cannot boast of, and which will ever render it impossible for that country to cultivate silk at as low a rate as is done in Bengal. For this plant a light, rich, elevated soil is made choice of; for the Hindoo cultivators say clayey ground, or such as allows the water to settle about the roots of the plants, will not do. The plantation, they say, requires to be renewed once in three or four years, to insure a succession of the best leaves. Cuttings are employed, and planted about the close of the rains, in rows three feet asunder, and about half that distance in the rows.

5. M. *tatarica. Willd.* iv. 369.

Dioecous, arboreous. *Leaves* cordate serrate, rather obtuse, mostly entire, though sometimes sinuate, or even lobate.

This small tree I have only found in a few gardens about Calcutta, and like *Morus Indica* have never found it in its wild state, nor can I learn from whence it originally came. This sort is never, so far as I can learn, cultivated in any part of India for the silk-worm, nor for any other purpose. The fruit is very small, like that of *Indica*, and of too little estimation to encourage any one to cultivate it. Flowering time in Bengal, February.

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6. M. *mauritiana. Willd.* iv. 371.

Dioecous. *Leaves* obovate oblong, entire. *Aments* cylindric.

Trophis *cylindrica. Roxb. Mss. N.* 1703.

Reported to be a native of Madagascar. Dr. Anderson of Madras received the plants from the Mauritius. In his garden they thrive well, and from thence seeds and cuttings were procured for the Botanic garden at Calcutta, in 1799, where they blossom and ripen their seed at various periods.

*Trunk* of the young trees in Dr. Anderson's garden, straight, and regularly clothed with spreading branches nearly to the base. *Bark* ash-coloured. *Leaves* alternate, short-petioled, obovate-oblong, entire, without pubescence, but a little scabrous, from two to three inches long by one or one and half broad. *Stipules* small, chaffy. *Aments* axillary, solitary, sub-cylindric; the *male* ones on one tree and the *female* ones on another, the latter generally recurved. *Male aments* half the length of the leaves. *Calyx* four-parted, divisions cordate, with villous margins. *Stamina* as in the genus, with double whole anthers. *Pistillum*; a four-winged rudiment of one in the centre. *Female aments* nearly the size of the male. *Calyx* four-leaved, enlarging with the germ into a fleshy covering for the single seed, which is covered by a crustaceous envelope. *Germ* superior, broad ovate, one-leaved, one-celled, ovulum single, attached to one side of the cell a little under its apex. *Style* or rather *stigma* two, subulate, villous on the inside, united at the base.

7. M. *paniculata. Roxb.*

Arboreous, dioecous. *Leaves* alternate, long-petioled, cordate, serrate, hoary underneath. *Panicles* axillary. *Female calyx* urceolate, entire. *Berries* round, pellucid, white.

Urtica *fruticosa. Banks's Herbarium.*

Perlarius primus. *Rumph. Amb.* iv. *t.* 56.

A native of the Moluccas, from thence the seed came amongst the earth with the spice plants, to the Botanic gar-

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den in 1798. Now, July 1802, both male and female trees are in blossom, and about fifteen feet high.

*Trunk* straight. *Bark* smooth, olive-coloured. *Branches* numerous, spreading in every direction. *Young shoots* clothed with much short, soft, hairy pubescence. *Leaves* alternate, petioled, from ovate to round-cordate, three-nerved, serrate, acute, harsh, deep green above, hoary underneath, from four to eight inches long, and from two to six or seven broad. *Petioles* rather shorter than the leaves, round, downy. *Stipules* semi-cordate, lanceolate, caducous. *Panicles* axillary, solitary, with a few flexuose branches. MALE FLOWERS, hitherto they have been only found in a distinct tree, and collected in little, rather remote fascicles over the ramifications of the panicles. *Calyx* four-toothed. *Stamens* long and recurved. FEMALE FLOWERS collected in little, round, aggregate heads. *Calyx* urceolate, entire, becoming succulent. *Style* or *stigma* single, long, curved, villous. *Berry* round, size of a pea, very succulent, pure, pellucid, white when ripe, and containing many very minute seeds.

The taste of the ripe fruit is sweet, but rather insipid.

## MONOECIA PENTANDRIA.

### *XANTHIUM. Schreb. gen. N.* 1426.

*Male calyx; common* imbricated. *Corol* one-petalled, five-cleft, funnel-formed. *Receptacle* chaffy. *Female calyx; involucre* two-leaved, two-flowered. *Corol* none. *Drupe* dry, murexed, two-cleft. *Nut* two-celled. *Linn. Syst.*

To our Indian plant the following essential generic character suits better, viz. *Male* aggregate. *Calyx; common*, imbricated; *corollets* tubular, five-toothed. *Nectary* cylindric, antheriferous. *Female calyx* as in the male. *Corol* none. *Germ* superior, two-celled; *cells* one-seeded; *attachment* inferior. *Styles* two pair. *Drupe* dry, muricate, two-celled. *Seed* solitary. *Embryo* erect, without perisperm.

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X. *Indicum. Kön. Mss.*

Annual, unarmed. *Leaves* reniform cordate, lobate, grossly serrate, dentate.

*Sans.* Aristha.

*Teling.* Veri-tel-nep.

*Tam.* Marlumutta.

A strong, robust annual, growing from two to three feet high; it delights in the banks of rivers, and rubbishy places, where it appears and flowers during the dry season only. It ought to be compared with X. *orientale*, for König thought them different, yet I suspect they are the same.

*Stem* erect, somewhat scabrous, clouded with dark coloured spots, annual. *Leaves* alternate, petioled, broad cordate, or rather tending to kidney-formed, somewhat lobed, notched, waved, three-nerved, scabrous; about four or five inches each way. *Petioles* round, scabrous, as long as the leaves. *Flowers* terminal, and from the superior axills. MALE FLOWERS aggregate, above the female ones, short-peduncled. *Corollets* from four to five-parted. *Nectary* tubular; *mouth* few-toothed, staminiferous. FEMALE FLOWERS below the male, sub-sessile, and solitary. *Calyx* one-flowered, many-leaved; *leaflets* lanceolate, hairy. *Germ* superior, oblong, armed with uncinate bristles, two-celled, each cell containing one ovulum enveloped in an interior tunic, a continuation of which, form the two long slender styles, which end in simple stigmas. *Perisperm* &c. as described by Gærtner.

*AMARANTHUS. Schreb. gen. N.* 1431.

*Male calyx* from three to five-leaved. *Corol* none. *Stamens* from three to five. *Female calyx* beneath, from three to five-leaved. *Corol* none. *Styles* three. *Capsule* membranaceous, one-celled, one-sided, opening horizontally. *Embryo* annular, and furnished with a perisperm.



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SECT. I. *Triandrous.*

1. A. *tenuifolius. Willd.* iv. 4381.

Annual, diffuse. *Leaves* wedge-shaped, emarginate. *Glomerules* axillary; *male flowers* diandrous, with a two-leaved calyx; the *female* ones irregular.

*Beng.* Jeel Chumli.

Found during the whole year, on cultivated ground near Calcutta.

*Root* perpendicular, with small lateral fibres, of a bright pink colour. *Stem* none, but numerous, smooth, alternately ramous branches, spreading close on the earth; their length from six to twelve inches. *Leaves* somewhat petioled, long, wedge-shaped, emarginate, with a bristle in the fissure, are smooth, and about an inch long. *Glomerules* axillary, never terminal. MALE FLOWERS with a two-leaved perianth, and two stamens. FEMALE FLOWERS more numerous than the male ones. *Calyx*, the internal flowers of the fascicle, or glomerule, have rarely any; the exterior ones have it consisting of one or two leaflets. *Capsule* with six longitudinal furrows coloured and not circumcised.

2. A. *polygonoides, Willd.* iv. 389. and *B. H.*

Diffuse. *Leaves* obovate. *Glomerules* axillary, two-parted. *Capsule* pullate, equalling the acute lanceolate leaflets of the calyx.

*Beng.* Cheloo nuteepa.

*Teling.* Chira kura.

Is the smallest species I know. It is annual, a native of almost every soil and situation, is a common weed in our gardens, where there is a constant succession of plants flowering all the year.

*Root* perpendicular. *Stems* in young luxuriant plants erect, with spreading branches from the base; but more frequently there are only many prostrate branches, with alternate, bifarious, smooth branchlets, from six to twelve inches

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long, often coloured on the upper side. *Leaves* alternate, in young plants with a stem, petioled, in others sub-sessile, oval, obovate, or wedge-formed; tapering down the petioles, pretty smooth, emarginate with a minute bristle, with *margins* tinged red, from a quarter to half an inch long. *Glomerules* axillary, two-parted, whether by a branchlet or not, never any thing like a spike. *Male flowers* most numerous. *Leaflets* of the calyx short, sharp-pointed; *stamina* three. *Capsules* longer than the calyx, bullate, with the apex coloured red. *Seed* shining black.

This species although wild, for I never saw any one that tried to cultivate it, the natives use as a pot-herb; it is reckoned exceedingly wholesome, for which reason convalescents have this species recommended to them in preference to any of the others.

3. A. *polygamus. Willd.* iv. 381.

Diffuse. *Leaves* rhomb-ovate, emarginate; *glomerules* axillary, or on terminal spikes. *Calyces* daggered, longer than the capsules.

Blitum Indicum album. *Rumph. Amb.* v. *t.* 82. *f.* 1.

*Hind.* Chumli sag.

*Beng.* Champa nuteeya, and Lal-Champa nuteeya, a reddish variety.

*Teling.* Dugala-kura, and Yerra-dugala kura, the reddish variety.

Wherein does A. *Blitum* differ from these?

A native of the same places with the last described, like them annual, and flowering at the same time. Both sorts are extensively cultivated all over the southern parts of Asia.

*Stem* when the plants are young, and in a good soil, erect, about a foot high, branchy near the base; but when old, or in a bad soil there are only several diffuse, smooth, striated, coloured branches; from nine to eighteen inches long. *Leaves* petioled, rhombiform, emarginate with a bristle, rugose, generally about an inch long. *Glomerules* axillary, very rarely



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on terminal, or other spikes. *Male flowers* most numerous, triandrous. *Calyx* twice the length of the capsule, leaflets awl-pointed. *Capsules* shorter than the calyx, less bullate than in A. *prostratus.*

4. A. *tristis. Willd.* iv. 385.

Erect, very ramous near the ground. *Leaves* rhomb-oval, obtuse, emarginate. *Glomerules* axillary, and on terminal spikes. *Calyces* daggered, longer than the capsules.

*Teling.* Qui-tota kura.

Blitum Indicum secundum. *Rumph. Amb.* v. *t.* 82. *f.* 2.

A. *campestris, Willd.* iv. 382, can be nothing more than one of the varieties of this very useful species, and it is more than likely that his A. *polystachyus, p.* 385, is another variety, if not the same. Qui-tota kura the Telinga name of A. *campestris,* (though by mistake I presume Willdenow inserts the word Tamul) is synonymous with *Kuppee-kirri,* the Tamul name of *polystachyus.*

Annual, I have never found it wild, it is held in great esteem by all ranks of the natives, and is much cultivated by them, it grows readily all the year round if watered.

*Root* perpendicular, coloured, reddish. *Stem* erect, below ramous, from one to two feet high, smooth, sometimes tinged red. *Branches* spreading or near the ground, as long as the stem. *Leaves* petioled, rhomb-ovate, tapering down the petiole, emarginate with a bristle, a little rugose; size very various, but in general about an inch broad. *Glomerules* axillary, and in long, terminal, erect, interrupted, green spikes (not two-parted.) MALE FLOWERS triandrous. *Leaves* of the calyx ending in an awled point, longer than the capsule.

It differs from A. *oleraceus* in having long, diffuse branches from the base, and from *Dugala kura* in having always terminal spikes; besides it may be cut down several times without destroying the plants, for they soon shoot out vigorously again; this renders it much more useful to the poorer natives, who are possessed of but a very small spot of

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ground, and little time to spare for its culture; besides it is in higher esteem than A. *oleraceus*, which yields but one crop.

When the plants are particularly red, which I believe is accidental, the Telingas distinguish them by the addition of the adjective *Yerra*, which means red. The plant figured is of this sort. There are other varieties beside these two.

5. A. *viridis. Willd.* iv. 388.

Ascending, ramous, from one to two feet high. *Leaves* elliptic, emarginate; *glomerules* axillary, and on small axillary branchlets. *Leaflets* of the calyces three, obtuse, and much shorter than the rugose capsules.

A native of various parts of India, appearing most frequently as a weed in gardens during the rainy and cold seasons. The tender tops are eaten by the natives, though not so much esteemed as the cultivated sorts.

6. A. *lividus. Willd.* iv. 386.

Erect, smooth, simple, from two to three feet. *Leaves* long-petioled, sub-ovate, retuse. *Glomerules* axillary, and on a terminal spike. *Calyces* from three to five-leaved, obtuse, which, with the bractes, are shorter than the round, compressed capsules.

*Beng.* Gobura nuteeya.

It is cultivated as a pot-herb. The stem is generally simple, from two to three feet high, polished, of a bright red colour, as are also the petioles, the leaves of dull greenish purple, with brighter coloured nerves, and veins. The bractes are shorter than the capsule; as are also the leaflets of the calyx; which with the broad, retuse leaves, make this species readily distinguished from all the rest.

7. A. *oleraceus. Willd.* iv. 386.

Erect, with a few branches above the middle. *Leaves* from broad rhomboidal, to ovate lanceolate. *Glomerules*

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axillary, and on a terminal spike. *Calyces* cuspidate, and rather longer than the rugose capsules.

*Teling.* Tota-Kura.

*Beng.* Sada-Nuteeya.

The figure which Willdenow, in his *Historia Amaranthorum*, gives for *oleraceus*, does not by any means agree with what König and myself have always considered to be that plant. His *inamoenus* is much more like it; if the leaves were emarginate, it would be a very excellent representation of this species. There are several varieties cultivated as pot-herbs over India, particularly on the coast of Coromandel, The most conspicuous, after the common green sort, particularly referred to in the above definition are,

1*st.* Yerra-tota Kura of the Telingas, a very beautiful variety, with a clear bright red stem, branches, petioles, nerves, and veins, and the leaves themselves rather ferruginous.

2*nd.* Tella-tota Kura of the Telingas; here all the parts that are red in the last variety are of a clear, shining, white colour.

3*nd.* Rosa or Pedda-tota Kura of the Telingas, is a very large variety, which König called A. *gigantens.* In a rich soil it grows to from five to eight feet high, with a stem as thick as a man's wrist. The tender succulent tops of the stem and branches are sometimes served up on our tables, as a substitute for *asparagus.*

The other varieties are more changeable, and not so well marked; I will not therefore take notice of any more of them.

8. A. *gangeticus. Willd.* iv. 384.

Erect, with sub-erect branches issuing out above the middle of the stem. *Leaves* rhomb-ovate. *Glomerules* axillary, as well as on single axillary, and compound, terminal spikes. *Calyces* three-leaved, which with the bractes are cuspidate and longer than the slightly rugose capsules.

The varieties of this useful species cultivated in Bengal alone are endless; and are in general known by the Hindoo name Lall Sag, or Dengua of the Bengalees. They are in

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more general use amongst the natives of Bengal then any other species, or variety.

In the above definition, I have aimed at including the whole, at least all that have fallen under my observation. They, as well as *oleraceus* and its varieties, differ most conspicuously from the other two extensive tribes of cultivated amaranths, viz. *polygamus* and *tristis*, and their varieties, in not admitting of being cut, with the hope of succeeding crops from the same roots, but are pulled up by the root, and carried to market in that state.

The varieties are tolerably permanent, and differ in colour chiefly, which varies from green, with the slightest tinge of red, to rufous, liver coloured, and bright red. One variety has particularly broad leaves, with the margins green, and the centre dark purple. It is a handsome plant.

9. A. *lanceolatus. R.*

Straight. *Leaves* lanceolar, plain green; *glomerules* triandrous, axillary. *Calyx* daggered, longer than the swelled, rugose capsules.

Bans-puta nuteeya, *i. e.* Bamboo-leaved amaranth, of the Bengalees.

A native of Bengal. I do not remember to have seen it on the Coromandel coast. Flowering time the rainy season.

*Stem* perfectly straight, with nearly erect, smooth branches; height in a good soil as far as from five to six feet. *Leaves* alternate, long-petioled, lanceolar, tapering much towards each end, rather obtuse at the point, with a bristle, from two to eight inches long. *Petioles* channelled by the decurrency of these leaves, and nearly of their length. *Glomerules* axillary, never any thing like a terminal spike, which circumstance alone distinguishes it from *oleraceus*, and all its varieties. *Bractes* numerous and like the calyx. *Calyx* of both male and female flowers three-leaved; *leaflets* lanceolate, daggered, membranaceous, with a green keel. MALE FLOWERS with three stamens. *Anthers* sagittate. FEMALE

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ones with three tapering styles. *Capsule* circumcised, wrinkled. The leaves and tender tops are eaten by the natives in their curries.

10. A. *atropurpureus. R.*

Erect, ramous, from three to six feet high. *Leaves* lanceolar, of a deep liver colour, above of a shining crimson, underneath purple. *Glomerules* axillary, as well as on a glomerate, terminal spike. *Calyx* three or five-leaved, cuspidate, and longer than the rugose capsules.

Bans-puta lal nuteeya of the Bengalees who cultivate this sort also as a pot-herb. It appears to me to be a well marked, very distinct species, which I have not found altered by change of soil.

11. A. *tricolor. Willd.* iv. 383.

Erect, from two to four feet high. *Leaves* approximate, broad rhomb-lanceolate, variously coloured. *Glomerules* axillary, large, half stem-clasping. *Calyces* of the three cuspidate leaflets, which are longer than the capsules. Common in gardens all over India and China. In Bengal it is in flower and seed the whole year.

12. A. *melancholicus. Willd.* iv. 383.

Erect, ramous, from six to twelve feet. *Leaves* remote, rhomb-ovate, coloured. *Glomerules* axillary. *Calyces* of three, cuspidate leaflets, which are longer than the capsules.

Found in gardens all over India; flowering time the rainy and cold seasons.

The last two species *melancholicus* and *tricolor*, differ fully as much in our gardens as any two species of the genus, not only in colour, but in size and habit. The former grows to be from six to twelve feet high during the rains, is ramous, and pyramidal, with the leaves more remote, much broader, and with rarely more than two colours, viz. a dull livid purple, and a most lively light crimson, one half of a few of the latter

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colour, white the other half, and all the lower leaves are of the former. Whereas A. *tricolor*, growing in the same soil, &c. rises to only three or four in height, with generally a simple, erect stem, and numerous, variegated, narrower leaves with very long glomerules of flowers in their axills.

I have not hitherto been able to find any Asiatic synonyms for either of these; Sir William Jones supposes the Sanscrit name, *Vastuca*, may belong to an *Amaranthus*, but to what species is uncertain.

13. A. *fascicatus. R.*

Erect, ramous above the middle. *Leaves* rhomb-ovate. *Panicles* terminal, composed of a few simple, cylindric branches. *Bractes* minute, shorter than the obtuse, three-leaved calyx, which is shorter than the rugose capsules.

Bun or *tuntuni* nuteeya of the Bengalees.

Chilaka tota Kura of the Telingas.

A common weed, and green in every part, with the exception of a crescent-shaped cloud or fillet of paler green crossing the centre of the leaves.

SECT. II. *Pentandrous.*

14. A. *hybridus. Willd.* iv. 389.

Erect, from two to three feet high. *Leaves* rhomb-lanceolar. *Racemes* naked, panicled, erect. *Leaflets* of the calyces three, rather obtuse, covering the very rugose capsules.

Introduced into Bengal from Persia, where it is indigenous.

15. A. *frumentaceus. Buchanan.*

Pentandrous, annual. *Stem* and *branches* erect. *Leaves* broad-lanceolar. *Panicles* erect. *Leaves* of the calyx daggered. *Capsules* wrinkled, seed pellucid, with callous white margins.

First discovered by Dr. Buchanan, on the hills between the



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Mysore and Coimbetore countries, where the natives call it *Kiery*, and cultivate it for the seed which they convert into flour, and which forms a great part of their subsistence.

In the Botanic garden forty square yards of ground, sown with this plant in June, yielded twenty-one pounds weight of the clear ripe seed in September. It also grows well during the cold season, viz. from October till February inclusive.

*Root* annual. *Stem* erect, often an inch or more in diameter, with numerous, erect branches from every part, more or less striated, otherwise perfectly smooth, colour from green to pretty deep red; height of the whole plant from one to seven feet according to the season. *Leaves* alternate, pretty long-petioled, from oblong to broad-lanceolar, acute, variously coloured like the stem and branches. *Panicles* terminal, each branch of the plant ending in a straight sub-cylindric one, composed of many appressed, crowded spikes. In short, the whole plant is so loaded with the inflorescence, as to appear almost a single, large panicle. *Calyx* longer than the stamens; *leaflets* in both male and female with subulate points. MALE FLOWERS with five stamina. The FEMALE ones with from two to three styles. *Capsule* rugose. *Seed* solitary, round, a little compressed, pellucid with a white margin.

16. A. *cruentus. Willd.* iv. 892.

Erect, ramous, from four to six feet high. *Leaves* long-petioled, broad lanceolar. *Panicles* terminal, crowded with erect, compound, and decompound branches. *Calyx* of five rather obtuse leaflets, which are shorter than the capsules.

A large, stout, ramous, erect, gaudy species; which blossoms earlier in the rains than the ornamental sorts, and does not vary in colour in our gardens in India; being of a pale green tinged with red, and the panicles which are from one to two feet long, crimson. The leaves are very remarkable for being concave, like a spoon, either on the upper or under side, occasioned by the margin being considerably contracted.

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17. A. *spinosus. Willd.* iv. 393.

Erect, ramous, round, with sharp spines in the axills of the leaves. *Spikes* terminal, simple, with sessile, axillary glomerules.

*Teling.* Mulloo tota Kura.

*Beng.* and *Hind.* Kanta nuteeya.

A very troublesome weed, particularly during the rainy and cold seasons.

## MONOECIA HEXANDRIA.

### *PHARUS. Schreb. gen. N.* 4. 1434.

*Male calyx; glume* two-valved, one-flowered. *Corol; glume* one or two-valved. *Female calyx; glume* two-valved one-flowered. *Corol; glume* one or two-valved. *Style* single. *Stigma* three; *seed* solitary.

P. *urceolatus. R.*

*Panicles* umbelled; both male and female flowers pedunculed, and with a one-valved, pitcher-shaped corol.

A native of Pulo Pinang.

*Root* creeping, perennial. *Leaves* bifarious, petioled, broad-lanceolate, smooth on both sides, and entire; from four to five inches long, and from one to two broad. *Petioles*, lower portion sheathing; above the sheathing portion, which ends in a bearded mouth, there remains about one inch, which is concave within. *Racemes* digitate, each bearing from four to six female flowers, all pedicelled; the lower, and upper ones accompanied with a male flower each, so that there are only two males to the spike. MALE FLOWERS. *Calyx; glume* two-valved, one-flowered. *Corol; glume* one-valved, opening on one side from the apex. *Filaments* six, the length of the corol. *Anthers* linear, there is only the rudiment of a three-pointed germ. FEMALE FLOWERS. *Calyx; glume* two-leaved, one-flowered. *Corol; glume* one-valved, pitcher-



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shaped, with a small round opening at the apex; hairy on the outside. *Nectary* two filaments from the base of the corol on the inside, and of about its length. *Germ* conical. *Style* length of the corol. *Stigmas* three, woolly.

### *LEUCOCEPHALA. R.*

*Flowers*, male and female, aggregated in a globular head, with a common calyx of five, or many leaflets, and a chaffy receptacle. *Male perianth proper* one-leaved. *Corollets*, or *tube* of the filaments, six-cleft; *divisions* subulate, bearing the anthers on their apices. *Female proper perianth* from two to three-leaved. *Corollets* three-petalled. *Style* three-cleft. *Capsule* superior, tricoccus.

1. L. *graminifolia. R.*

*Leaves* ensiform. *Common calyx* five-leaved.

Eriocaulon *quinquangulare. Willd.* i. 485.

*Beng.* Goori.

The figure referred to in Pluckenet, viz. *t.* 221. *f.* 7, agrees well with this species, and I doubt the possibility of distinguishing it from *sexangulare* by the scape, particularly in the dry specimens, as I could never do it with the living plant, so that I conclude some other specific character must be looked for, such as I have ventured to give.

It is a common annual, in wet cultivated places in most parts of India, appearing about the close of the rains.

*Leaves* few, radical, sword-shaped. *Scape* erect, naked, from three to six inches, striated lengthways. *Head* of corollets aggregate, globular, white from little filaments on the apices of the scales of the receptacle. *Calyx, common* of five, oval leaflets. *Male florets* chiefly in the centre, short-pedicelled. *Perianth, proper* one-leaved, wedge-shaped, emarginate, placed on the inside, and inserted on the proper pedicel of the corollets, gaping on the outside, and there covered by a large chaffy, dark-coloured, wedge-shaped scale,

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the apices of both white with small filaments. *Florets* one-petalled, funnel-shaped; *border* of six subulate divisions. *Filaments* no other than the divisions of the border of the florets, every alternate one broader, and with a bearded process near the middle on the under side. *Anthers* six, resting, incumbent on the apices of the divisions of the florets, blue. *Pistillum* no other than a three-lobed gland in the mouth of the tube. *Female florets* most numerous, and chiefly in the circumference, short-pedicelled. *Perianth proper* from two to three-leaved, but the scales of the receptacles as in the male. *Florets* of three, filiform, white petals. *Stamens* none. *Germ* superior, three-lobed. *Style* three-cleft. *Stigmas* recurved. *Capsules* three-lobed, three-celled. The extreme delicacy of the partitions may render their presence doubtful. *Seed* solitary, oval, affixed by the apex. *Receptacle* globular, chaffy, with some hairs interspersed; the chaff or scales are numerous, of which one always embraces the under side of each floret, but there are many more of them than florets.

*Note.* The generic character of *Eriocaulon* must have been taken from other species, for this has not the smallest affinity to it.

2. L. *spathacea. R.*

*Leaves* spathiform. *Common calyx* many-leaved.

Eriocaulon *sexangulare. Willd.* i. 485.

A native of the same places with L. *graminifolia,* and differing from it in the following points only.

*1st.* In this the leaves are shorter, broader and embracing from three to four culms, so that they are more like common spathes than leaves. In that they are simple, sword-shaped.

*2nd.* In this the common calyx is composed of about twenty leaflets. In that five-leaved.

Besides, in the specimens of this which I have examined, the scales of the heads of corollets are naked. In that they are clothed with small delicate, white filaments.

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*COCOS. Schreb. gen. N.* 1692.

***Male calyx*** three-leaved. ***Corol*** three-petalled. ***Filaments, calyx*** five-leaved. ***Corol*** three-petalled. ***Germ*** superior, three-celled; ***cells*** one-seeded; ***attachment*** superior. ***Stigma*** three-lobed. ***Drupe*** coriaceous. ***Embryo*** in the base of the perisperm.

C. ***nucifera. Willd.*** iv. 400. ***Corom. pl.*** i. ***N.*** 73.
Unarmed. ***Fronds*** pinnate; ***leaflets*** plaited, nuciform.
***Tenga. Rheed. Mal.*** i. ***t.*** 1, 2, 3, 4.
Calappa. ***Rumph. Amb.*** i. ***t.*** 1, 2.
Neriula. ***Asiat. Res.*** iv. ***p.*** 312.
***Sans.*** Narikela, Narikelee.
***Hind.*** Naryel, or Nariel.
***Beng.*** Narikel.
Cocos Nucifera. ***Linn.***
***Teling.*** Nari Kudum, or Kobri-Chulloo.
***Tam.*** Tenga.

This tree is two well known to require a description; its generic character, that of the East-Indies I mean, (that of the West Indies may be different,) differs a little from the description of the last edition of the *Genera plantarum*, viz. *Schreber's.*

***Spathe*** universal, axillary, cylindric, oblong, tapering equally towards each end, bursting longitudinally its whole length; texture somewhat woody; perfectly smooth on the inside, slightly striated lengthways on the outside, from two to three feet long. ***Spadix*** nearly erect, very branchy, flexuous. ***Branches*** thereof simple, flexuous, bowing a little. MALE FLOWERS numerous, above the female ones, approximated, sessile. ***Calyx*** three-leaved, leaflets small, broad-cordate, firm, fleshy. ***Petals*** three, as in the *Genera plantarum.* FEMALE FLOWERS generally one, though sometimes there is one near the base of each ramification of the spadix, and accompanied by a male flower on each side. ***Calyx*** inferior, five-leaved, the

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exterior two small, and may be called bractes. *Corol* three-petalled, if five are allowed for the calyx, cordate, smaller than the inner three leaflets of the calyx, of a firm leathery texture, concave, and not expanding, except in a trifling degree, unless force be used. *Nectary* a thin orange-coloured ring surrounding the base of the germ. *Germ* somewhat conical. *Style* none. *Stigma* small, immersed in the apex of the germ slightly three-lobed.

The nut is well described and delineated by Gærtner. Of this valuable, and very elegant tree, there are several varieties, if not distinct species, cultivated near the shores of India. They do not thrive at any distance from the sea. Flowering time the hot season; the nuts ripen about the close of the rains, or beginning of the cool season in October or November. The uses of this tree and its produce are numerous, and well known.

*ARECA. Schreb. gen. N.* 1696.

*Male calyx* three-parted. *Corol* three-petalled. *Female calyx* three-leaved. *Corol* three-petalled; *nectary* six-toothed. *Germ* superior, one-celled, one-seeded; *attachment* inferior. *Drupe* coriaceous. *Seed* single, ruminate. *Embryo* in the base of the perisperm.

1. A. *catechu. Willd.* iv. 524. *Corom. pl.* i. *N.* 74.

*Trunk* straight, and slender, from forty to fifty feet high. *Fronds* pinnate; *leaflets* compound, linear, opposite, præmorse. *Spathe* erect, ramous. *Male flowers* hexandrous. *Seed* of a roundish conic form and obtuse.

Areca *faufel. Gært. Fruct.* i. 19. *t.* 7. *f.* 2.

Pinanga. *Rumph. Amb.* i. 1. 4.

Caunga. *Rheed. Mal.* i. 5. 8.

*Sans.* Goovaka.

Guvaca. *Asiat. Res.* iv. *p.* 312.

*Pers.* and *Hind.* Soopara.

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*Arab.* Foolful.

*Beng.* Gooa.

*Teling.* Poka chelloo.

Where this tree grows wild I cannot say from my own observation, but it is cultivated in all the warmer parts of Asia, and is in flower most part of the year. It is the most beautiful palm we have in India. The trunk grows remarkably straight, often from forty to fifty feet high, and in general about twenty inches in circumference, equally thick in every part, and smooth, but the tree is so well known, and fully described, that I should not have thought of mentioning it, had I not found that its family character was imperfectly known.

*Male* and *female flowers* are in the same spadix. *Spathe* double. *Spadix* very branchy. MALE FLOWERS very numerous, about the female ones, sessile, without bractes. *Calyx* one-leaved, small, three-cornered, three-parted, smooth. *Petals* three, oblong, rigid, striated, smooth, many times longer than the perianth. *Filaments* generally three, very short and broad, two-parted, inserted round the base of the abortive germ. *Anthers* always six, sagittate. *Germ* no other than a short culm, which splits into three short, obtuse segments. FEMALE FLOWERS one, two, or three, at or near the base of each ramification of the spadix, sessile without bractes. *Calyx* three-leaved; *leaflets* cordate, rigid, fleshy, permanent. *Corol* three-petalled, like the calyx, and permanent. *Nectary* membranaceous, generally six-toothed, embracing closely the base of the germ. *Germ* oval. *Style* scarcely any. *Stigmas* three, short, triangular. The *drupe* is well described, and delineated by Gærtner, *vol.* i. *p.* 19. *t.* 7. *f.* 2.

On the Malabar coast the common black pepper vine is usually trained up to this tree, which renders it more useful in those parts, than any other.

2. A. *Dicksonii. Roxb.*

*Fronds* pinnate; *leaflets* ribbed, with præmorse ragged

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apices. *Spadix* axillary, ramous, retrofracted, branches thereof with alternate, distichous fascicles of two male, and one female flowers, the former polyandrous, the latter with a six-horned nectary. *Fruit* oblong.

A native of the mountains of Malabar, where it was found by Dr. Dickson, both in flower and ripe fruit in the month of August. It grows to the height of about sixteen or eighteen feet, with a very straight, simple trunk, of about two inches in diameter.

*Leaves* pinnate, about four feet long, with extremities bifurcate, like the tail of a swallow. *Leaflets* sessile, linear, ribbed, with numerous parallel veins, apices præmorse, dentate; from twelve to twenty-four inches long. *Spathe* simple. *Spadix* compound, retrofracted; *ramifications* from four to eight, alternate, simple, equal, distichous; from six to eight inches long. *Flowers* numerous, approximate, alternate in two exactly opposite rows, a single female in the centres, with a single male on each side. MALE FLOWERS. *Calyx* three-cleft, division subulate, nearly as long as the corol. *Corol, petals* three, cordate, with slender tapering apices. *Filaments* very short. *Anthers* from twenty to thirty, linear. FEMALE FLOWERS. *Calyx* of three reniform leaflets. *Corol* like the calyx. *Nectary*, six clavate, hairy headed scales. *Germ* superior. *Style* short. *Stigma* three-lobed. *Berry* oblong, dry and fibrous, about an inch long, by half an inch in diameter. *Seed* of the shape of the berry, ruminated. *Embryo* lodged in the base.

Mr. Dickson, the Surgeon at Bedanore, who first brought the plant under my observation, observes that the nut is used by the poorer people, as a substitute for the common *Areca*, but no other part of the tree is turned to any useful purpose.

3. A. *triandra. R.*

Arboreous, stoloniferous. *Fronds* pinnate; *leaflets* com-



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pound, præmorse. *Spadix* ramous, erect. *Male flowers* triandrous. *Fruit* oblong.

*Beng.* Bun-gooa.

A native of Chittagong, where it was first observed by Dr. Buchanan, who sent plants of it to the Botanic garden at Calcutta in 1797. In 1808 the largest plant was in flower from May till January, and the seeds of the first blossoms were ripe in April 1809.

*Trunk* perfectly straight, in our eleven or twelve years old plants about seven feet high, A. *catechu* would have been triple that height in the same time, quite simple, seven inches in circumference, perfectly round, and smooth, except the circular marks of the fallen leaves. *Fronds* pinnate, from four to five feet long. *Leaflets* sub-alternate, linear, præmorse, two or more toothed, or ending in one centre, ensiform, smooth, plaited, from two to three feet long. *Spathe* smooth, convex underneath, length from the top of the sheath to the leaflets, from three to four inches, and there channelled, beyond this portion a sharp high ridge. *Spathe* cylindric, smooth, about a foot long. *Spathe* simple, axillary, linear-oblong, smooth; the outside convex, the inner concave, with a sharp edge all round, and opening by a longitudinal slit on the middle of the inside, caducous. *Spadix* erect, short, decompound. *Ramifications* both first and second bifarious, alternate, patent. MALE FLOWERS sessile, very minute, one on each side of every female, and numerous over the filiform extremities of the secondary ramifications of the spadix. *Calyx* very minute, three-leaved. *Petals* three, tapering obliquely. *Filaments* three, very short. *Anthers* sagittate. *Germ* a slender, cylindric column in the centre. FEMALE FLOWERS few, alternate, sessile, below the middle of the same ramifications, much larger than the male ones. *Calyx* three-leaved; *leaflets* oval, hard, concave. *Petals* three, longer than the calyx, oval. *Nectary*, six very small scales round the base of the germ. *Germ* oblong, one-celled, containing a single ovulum, and sometimes one or two abortions attached to the

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bottom of the cell. *Style* none. *Stigma* conic, and composed of three, small, unequal, conic lobes. *Berry* oblong, of the size of an olive, but longer, smooth, when ripe of a lively orange, becoming red. *Pulp* in small quantity, and mixed with many longitudinal, strong, ligneous fibres, one-celled. *Seed* conform to the berry, much ruminated as in *catechu*, and with embryo lodged in its very base.

4. A. *gracilis. R.*

*Leaves* pinnate; *leaflets* few, plaited; lower pairs falcate, alternate, acuminate, the terminal pair præmorse. *Spadix* axillary, simple, retrofracted, with flowers on all sides; *male* polyandrous. *Seed* oblong.

*Beng.* Gooa soopari, and Ramgooa are the vernacular names at Silhet.

An elegant, tall, slender species, a native of the hills of Chittagong, Silhet, and the east border of Bengal, where it blossoms during the hot season; and the seed ripens in October.

*Trunk* erect, straight, marked with the circular scars of the fallen leaves, about as stout as a walking cane, and from six to ten feet high. *Leaves* alternate, pinnate, smooth, about three feet long. *Leaflets* from three to four pair, opposite or sub-alternate, plaited, from two to three inches broad, and from twelve to eighteen inches long, lower pairs falcate, with the exterior half tapering to a very long, fine point, exterior pair shorter, linear, and præmorse, with each of the plaits ending in a bifid point. *Petioles* somewhat triangular, with a vaginated base. *Spathe* one-leaved with a bifid apex, opening down the interior or concave side. *Spadix* axillary, generally simple, retrofracted, completely clothed on all sides with male and female flowers, viz. for every female two males, one on each side. *Male calyx* minute, three-cornered. *Petals* three, obliquely cordate, acute, many times longer than the calyx. *Stamina* numerous, shorter than the corol. *Female calyx* and *corol* of three equal leaflets, and petals each.



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*Nectary* none. *Germ* oval, one-celled; *ovula* solitary, attached to the bottom of the cell. *Style* shorter than the germ. *Stigma* large, infundibuliform, with ragged edges. *Drupe* oblong, obtuse pointed, scarcely so long as a field bean; the fibrous pulp covered with a thin, smooth skin. *Seed* solitary, oblong, with the base a little oblique. *Integument* single, brown, somewhat spongy, and adhering firmly to the perisperm, into which it enters as in the common *Areca*. *Perisperm* conform to the seed. *Embryo* simple, ovate, lodged in the base of the perisperm.

5. A. *disticha. Roxb.*

*Fronds* furcate. *Spadix* axillary, simple, retrofracted, distich. *Male flowers* dodecandrous. *Female* without nectary. *Fruit* ovate.

A native of the shady forests of Pulo Pinang, where it was found by Mr. W. Roxburgh.

*Stem* about as thick as a common rattan, marked with the annual cicatrices of the fallen fronds, from twenty-four to thirty-six inches high. *Fronds* forked, nerves many, simple and parallel, smooth on both sides; *apices* of the two divisions obtuse, and ending in as many slender points, as there are nerves in the upper portion of the divisions; whole length about twelve or fifteen inches. *Stipes* sheathing. *Spathe* one-leaved, opening on the inside, caducous. *Spadix* solitary, on the inside of the sheath of the stipe, and hid by it till it falls off, simple, distich, by the time the flowers expand retrofracted, flexuose, woolly, from two to three inches long. *Flowers* sessile. The *female* ones solitary, on the projecting angles of the rachis, with a single male on each side of each female. *Male calyx* three-leaved, or deeply three-cleft, small. *Corol; petals* three, unequal, obliquely ovate, peltate, much longer than the calyx. *Filaments* about fifteen, short. *Anthers* linear. *Female calyx* or *corol*, or both, six-leaved. *Leaflets* nearly equal, ovate, or nearly round, concave. *Nectary* none, or no rudiments of filaments. *Germ* oval. *Style*

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none. *Stigma* a large scabrous gland. *Drupe* ovate, smooth, when ripe orange red; *pulp* in a small quantity, and replete with fibres. *Seed* ovate, with a clear horny texture, scarcely ruminate, with the embryo lodged in the base.

### *BENTINCKIA. Berry's MSS.*

*Spathe* universal, one-valved. *Spadix* ramous. *Male calyx* three-toothed. *Corol* three-petalled. *Female calyx* and *corolla* as in the male. *Nectary* six-leaved, (*abortive filaments.*) *Germ* superior, three-celled, one cell fertile, and one seeded; *attachment* interior. *Berry* spherical, succulent, one-seeded. *Embryo* lodged in the base of the perisperm.

B. *Condapanna. B.*

*Tam.* Conda-pana.

An elegant, very slender palm, of about twenty feet in height with pinnate leaves, as in the coconut tree, and large decompound, lateral spadices below the leaves. Dr. Berry found it on the mountains of Travancore and observed only male, or male hermaphrodite flowers in some, and female ones only on others. Flowers in June, and the seed ripens in about eight or nine months afterwards.

### *WRIGHTEA. R.*

*Spathe* many-leaved. *Spadix* ramous. *Male perianth proper* one-leaved, entire. *Corol* one-petalled, trifid. *Female calyx* double, the exterior one two-leaved, the interior one three-parted. *Corol* one-petalled, trifid. *Germ* from two to three-celled; *cells* one-seeded; *attachmemt* inferior. *Berry* with from one to three seeds. *Embryo* dorsal.

1. W. *caryotoides. R.*

Chilputta, or Belputta, it is called at Chittagong, where the plant is found indigenous, blossoming in July. The seed ripens during the cold season.

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*Trunk* scarcely any, until the plant blossoms, and then it may be called the base of the spadix, rising above the fibrous margined sheaths of the fronds. From the base numerous shoots continue to spring, which renders propagation easy. *Leaves* or *fronds*, few, alternate, petioled, from three to eight feet long. *Leaflets* sessile, variously disposed; on the lower half of the stipe they are generally in opposite fascicles, of two or three, those further in are for the most part single, and alternate; all are wedge-shaped; lateral margins entire, apices præmorse at very various distances from the base, and jagged with the sharp points of the numerous parallel, fine fibres which run up through the substance of the leaflets; upper surface smooth, of a shining deep green, whitish underneath, general length about one foot or fifteen inches. *Petioles* or *stipes* at the base, sheathing, the rest sub-cylindric, tapering a little, while young covered a little with a large portion of a brown mealy substance. *Spadix* terminal, many-leaved. *Leaflets* of various sizes, and of a soft delicate, leathery texture, striated lengthways, covered on the outside with mealy matter, smooth on the inside, general length about that of the spadix. MALE FLOWERS very numerous over every part of the branches of the spadix, small, pale, of a yellowish white. *Perianth* cylindric, one-leaved, almost solid, there being only an excavation in the apex for the reception of the corol; margin marked with three small protuberances; smooth on both sides. *Corol; petals* three, lanceolate, smooth, fleshy. Nothing like a nectary, nor germ to be seen. *Filaments* six, short, inverted on a small, hollow receptacle in the centre of the corol. *Anthers* linear. FEMALE FLOWERS few, and amongst the male near the base of the branches of the spadix. *Perianth* may be called double, in that case the exterior one is of two, reniform leaflets; the interior one one-leaved, cup-shaped, with the border three-parted. *Corol* as in the male. *Stamina* nothing like any, nor is there any nectary. *Germ* superior, ovate, two, rarely three-lobed; two, rarely three-celled with one ovulum in each attached to

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the lower and inner angles of the cell. *Style* none. *Stigma*, a two or three-lobed, conical, brown point. *Pericarp*, a dry, ovate oblong berry, about the size of a nutmeg, two, rarely three-celled, three seems the natural number, though two is most common. *Seeds* solitary, ovate-oblong, about the size of a large coffee bean. *Integuments* single, thin, brown, veined, adhering firmly to the perisperm. *Perisperm* horny, of one uniform pale colour. *Embryo* in the back of the seed.

The name which Dr. Roxburgh has given to this genus is in honour of William Wright, M. D. F. R. S. and President of the College of Physicians of Edinburgh. The plant formerly named after this eminent Physician and Botanist, being found to be a species of *Blakea*.

### *SAGUS. Gært.*

*Spathes* many. *Spadix* (terminal) super-decompound. *Male calyx* three-toothed. *Corol* three-parted. *Stamina*, inserted on the base of the corol. *Female calyx* and *corol* as in the male. *Stamina* abortive. *Style* three-parted. *Berry* backwardly imbricated with cartilaginous scales. *Seed* solitary. *Embryo* lateral.

1. S. *inermis. R.*

Arboreous, unarmed. *Embryo* lodged in or near the apex of the seed. *Leaves* pinnate.

S. lævis. *Rumph. Amb.* i. *p.* 76.

A native of Sumatra and Borneo, and of the Islands between them; growing spontaneously in low swampy lands. From the pith of the tree the granulated *Sago* which we meet with in Europe is made. The Malays themselves prefer the *Sago meal of Sagus spinosus*, (*Lapia-tuni*, or genuine Sago tree of Rumphius.) See *Herbar. Amb.* i. *p.* 75.

2. S. *Rumphii. Willd.* iv. 404.

Arboreous, armed, with strong straight spines. *Leaves* pinnate.

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S. *farinifera. Gært. Sem.* ii. *p.* 186. *t.* 120. *f.* 3.

S. sive Palma farinaria. *Rumph. Amb.* i. *p.* 72. *t.* 17, 18.

Sago Palm. *Annals of Botany*, i. *p.* 193. *t.* 4.

A native of the Peninsula of Malacca, and the Malay Islands.

Like the Banana and Plantain it propagates itself by suckers from the roots of the old trees, the seed is therefore in general abortive. This, the Malay Sago Palm, is the tree, the pith of which is the staff of life to the inhabitants of the Moluccas.

## MONOECIA POLYANDRIA.

### *CERATOPHYLLUM. Willd.*

*Male calyx* many-parted. *Corol* none. *Stamina* sixteen, or more. *Female calyx* many-parted. *Corol* none. *Pistillum* single. *Style* subulate. *Nut* one-seeded.

C. *verticillatum. R.*

*Leaves* verticelled, twice dichotomous. *Leaflets* of the male calyx bidentate, of the female one entire. *Style* twice as long as the germ. *Fruit* three-horned.

*Beng.* Jhaunji.

Found in pools of sweet water in the vicinity of Calcutta during the dry season.

### *CARYOTA. Schreb. gen. N.* 1701.

*Male calyx* three-leaved. *Corol* petalled. *Female calyx* and *corol* as in the male. *Germ* superior, three-celled; *cells* one-seeded; *attachment* inferior. *Stigma* sub-peltate. *Berry* from one to two-seeded. *Embryo* near the vertex of the perisperm.

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C. *urens. Willd.* iv. 493.

Unarmed. *Leaves* bipinnate; *leaflets* alternate, wedge-shaped, obliquely præmorse.

*Teling.* Jeeroogoo.

Saguaster Major. *Rumph. Amb.* i. *t.* 14.

Schunda pana. *Rheed. Mal.* i. *t.* 11.

A native of the various mountainous parts of India, where it grows to be one of the largest and most charming of this beautiful tribe, or natural order. Flowering time the hot and rainy seasons.

*Trunk* straight, often sixty feet high, thick in proportion, columnar, and marked slightly with the annular cicatrices of the petioles. It grows about as fast as the coconut tree, when in a soil and situation congenial to its nature. *Leaves* pinnate. *Leaflets* sub-alternate, sessile, obliquely præmorse; the præmorse part much jagged with sharp points. *Spathe* many-leaved. *Spadix* pendulous, from six to sixteen feet long, branchy; *branches* simple, from four to eight feet long, pretty thickly covered with innumerable sessile flowers, and these most regularly disposed in threes; one male on each side, and a single female between them. *Male calyx* three-leaved, cup-form; *leaflets* unequal, concave, of a very firm texture, permanent. *Petals* three, much larger than the calyx, elliptic, concave, of a firm leathery texture, green on the outside, whitish on the inside. *Filaments* numerous, very short. *Anthers* linear. *Female flowers* on the same spadix. *Calyx* and *corol*, as in the male. *Stamens* and *nectarial filaments* three, between the corol and base of the germ, each ending in a glandular enlarged apex. *Germ* superior, three-sided. *Style* none. *Stigma* small, two-cleft. *Berry* roundish, one-celled, of the size of a nutmeg, covered with a thin, yellow, acrid bark, but nothing that deserves the name of pulp. *Seed* or *nut* generally solitary.

This tree is highly valuable to the natives of the countries where it grows in plenty. It yields them, during the hot season, an immense quantity of toddy or palm wine. I have



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been informed that the best trees will yield at the rate of one hundred pints in the twenty-four hours. The pith or farinaceous part of the trunk of old trees, is said to be equal to the best Sago; the natives make it into bread, and boil it into thick gruel; these form a great part of the diet of those people; and during the late famine, they suffered little while those trees lasted. I have reason to believe this substance to be highly nutricious. I have eaten the gruel, and think it fully as palatable as that made of the Sago we get from the Malay countries.

## *SAGUERUS. R.*

***Male calyx*** three-leaved. ***Corol*** three-petalled. ***Female calyx*** five-leaved. ***Corol*** three-petalled. ***Germ*** superior, three-celled; ***cells*** one-seeded, attached to the base of the axis. ***Style*** none. ***Stigma*** tridentate. ***Berry*** three-celled, with a single seed in each cell. ***Embryo*** in the back of the perisperm.

S. *Rumphii. Roxb.*

Palma Indica vinaria secunda, Saguerùs, sive Gomutus Gomuto. *Rumph. Amb.* i. *p.* 57. *t.* 13.

Anou. *Marsden's History of Sumatra, p.* 77.

Aringa *Saccharifera of Labilliardiere.*

Borassus *Gomutus. Lourier. Cochin Ch.* 759.

This beautiful and stately palm appears to be indigenous in all the Islands to the eastward of the Bay of Bengal, several of the plants were introduced into the Company's Botanic garden at Calcutta by Colonel Kyd, about twelve years ago; and now, (December 1799,) two, three or four of the largest of them have been in blossom for these two years past.

***Trunk*** straight, as yet short, and covered entirely with sheaths of the fronds, and the black horse-hair-like fibres, called by the Malays *Ejoo,* which issue in great abundance from the margins of those sheaths. As the trees advance in

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size and age, these drop off, leaving an elegant, columnar, naked trunk, as described by Rumphius. The whole height of the largest of the trees in the Botanic garden, including the leaves, about forty feet; the trunk rises fifteen or twenty feet, and the rest is made up by the fronds or leaves alone. *Fronds* pinnate, from fifteen to twenty-five feet long. *Leaflets* sessile, approximated, numerous, opposite, also alternate, sword-shaped, their greatest breadth being near the base; a blunt barbed process on one, or both sides of the base, accounts for their greatest breadth being there; numerous parallel fibres run lengthways on each side of the large, middle, four-sided nerve; these end in acute, spinous points on each side, and as the breadth contracts most towards the apex, these sharp points are there more numerous; the apex is præmorse, or variously ragged, with the same points; the upper surface smooth, of a shining deep green; the under side is clothed with much ash-coloured, mealy matter, which is firmly attached to the substance of the leaflets; the length from three to five feet, the greatest breadth from four to five inches. *Stipes* with broad, stem-clasping bases, fringed with a very large portion of strong black fibres, like coarse black horse hair, intermixed with firm twigs, not unlike long, slender porcupine's quills; these serve to make their adhesion to the trunk more firm. Above they become three-sided, tapering, pretty smooth, except for a portion of mealy matter with which they are covered, till it is removed by friction. Length below the leaflets from four to six feet, leaflet-bearing portion from twelve to twenty feet. *Spathe* of many short imbricated leaflets, entirely covering the base or undivided part of the spadix. *Spadix* pendulous, branchy, from above six to ten feet long. In general they issue singly from the middle of the base of the stipes. *Branches* numerous, and simple, all perfectly pendulous. MALE FLOWERS numerous, occupying the lower spadices, without any mixture of female ones, and then in pairs, they are large, and the anthers loaded with pollen; sometimes they are mixed with



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the female flowers, in which case they are small, with less fertile anthers, and placed one on each side of a female flower. *Calyx* three-leaved; *leaflets* roundish, fleshy, concave, with their margins thin and imbricated. *Corol* of the large or proper male flowers, three-petalled. *Petals* sub-linear, smooth, expanding, of a firm leathery substance, concave and yellow on the inside, and of a deep purple on the outside; *margins* thick and meeting only. *Stamens* numerous, the length of the petals. *Filaments* short, inserted into a fleshy receptacle in the centre of the flower. *Anthers* linear. FEMALE FLOWERS sometimes in the same spadix, with the male, and then just half as numerous as the male, but in general they occupy separate spadices above those of the perfect male, or have the less perfect male flowers which accompany them, very small, probably abortive. *Calyx* five-leaved, *leaflets* short, unequal, imbricated, scarcely a third of the length of the corol. *Corol* three-petalled, the petals cordate, and much shorter than in the male. *Stamens*, rather *nectarial filaments*, sometimes there are three, very small round the base of the germ, as in *Caryota urens*, sometimes they are entirely wanting. *Germ* superior, three-lobed, smooth. *Style* none. *Stigmas* three, conical and three-sided. *Berry* as large as a crab apple, three-lobed, three-celled, smooth, fleshy, when ripe yellow, pulp very acrid. *Seeds* one in each cell, oblong, somewhat three-sided, affixed by the lower pointed end to a central receptacle, covered with a hard, black, tolerably smooth, thin shell. The *embryo* of the future plant is lodged about the middle of the interior convex of the perisperm.

The tree is nearly allied to *Caryota*. The chief difference is in the pericarpium, which is in this a three-seeded berry, in that one or two-seeded only. With respect to the various and important uses of this most elegant palm I have nothing to offer myself, but refer to what Rumphius and Marsden have written on the subject. At the same time, I cannot avoid recommending to every one who possesses lands, particularly

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such as are low, and near the coasts of India, to extend the cultivation thereof as much as possible. The palm wine itself and the sugar it yields, the black fibres for cables and cordage, and the pith for sago, independent of many other uses, are objects of very great importance, particularly to the first maritime power in the world which is in a great measure dependant on foreign states for hemp, the chief material of which cordage is made in Europe.

From observation made in the Botanic garden, well grown, thriving trees produce about six leaves annually, and each leaf yields from eight to sixteen ounces of the clean fibres.

*Note.* In the same garden are now (1810) many thousand plants, and young trees, some of them above twenty years growth, with trunks as thick as a stout man's body, and from twenty to thirty feet high, exclusive of the foliage. They are in blossom all the year; one of them was lately cut down, and yielded about 150 pounds of good Sago meal.

*ALEURITES. Schreb. gen. N.* 1472.

*Male calyx* one-leaved, two or three-cleft. *Corol* five-petalled. *Female calyx* and *corol* as in the male. *Germ* single, two-celled, with one ovulum in each, suspended from the top of the partition. *Styles* two, each two-cleft. *Drupe*, with two very hard, one-celled nuts. *Embryo* converse and furnished with a perisperm.

A. *triloba. Forst. gen. N.* 56. *Willd.* iv. 590.
Camirium. *Rumph. Amb.* ii. *p.* 180. *t.* 58.
C. *cordifolium. Gært. Sem.* ii. *t.* 125.
Juglans *Camirium. Lourier. Cochin Ch.* 702.
Croton *moluccanum. Willd.* iv. 551.
*Beng.* Akroot, which is also the name of the common Walnut.

A large tree, now pretty common in gardens about Calcutta, originally from the Malay countries. Flowering time the hot season; seed ripe in August.

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*Trunk* erect. *Branches* numerous, drooping, spreading and ascending. *Bark* smooth, olive-coloured; *young shoots* covered with much brownish stellate pubescence. *Leaves* about the extremities of the branches, approximate, petioled, cordate; margins frequently scollop-toothed, or even three or five-lobed; when young both sides covered with the same stellate pubescence that is found in the young shoots, but whiter, when full-grown pretty smooth, from four to eight inches long, and from three to six broad. *Petioles* round, as long as the leaves; two hemispheric glands at the apex as in several of the *Crotons*. *Stipules* none. *Panicles* terminal, erect, oval, clothed, as are all the other young parts with harsh, hairy, stellate pubescence; *flowers* numerous, small, white; *branches* caducous. MALE FLOWERS terminal, small, and most numerous. *Calyx* one-leaved, generally two-cleft; divisions erect, sometimes a little sub-divided, falling. *Petals* five, oblong, tapering towards the base. *Nectary*, five small yellow glands between the insertion of the petals. *Filaments* about twenty, inserted into a hemispheric receptacle, short, thick, woolly. *Anthers*, two pits on the inside of the apex of each filament. FEMALE FLOWERS sessile, in the divisions of the panicle. *Calyx*, *corol* and *nectary* as in the male. *Germ* superior, single, oval, compressed, covered with stellate hairs, two-celled, each cell containing a single ovulum pendulous from the top of the partition. *Styles* two, each two-cleft to its base. *Stigma* incurved, acute. *Drupe* two-celled, fleshy, roundish, a little compressed, pretty smooth, somewhat pointed, slightly marked on the sides with four sutures, when ripe olive-coloured; the greatest diameter about two inches and half; *cells* lined with a firm, smooth, brown integument; it frequently happens that there is only one nut in the drupe, the form and size is then different. *Nuts* two, one in each cell, thick, and very hard, dark coloured, irregularly furrowed, particularly on the exterior side covered with a firm, fleshy substance; which is white on the outside and marked with green veins within, next to the

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nut, of a yellowish colour. *Nucleus* conform to the cavity of the nut. *Perisperm* amygdaline. *Embryo*, &c. as in Gærtner.

The kernels taste very much like fresh Walnuts, and are reckoned wholesome; they yield by expression a large portion of very pure, palatable oil.

*JUGLANS. Schreb. gen. N.* 1446.

*Male calyx* a one-leaved scale. *Corol* none. *Stigmas* eighteen. *Female calyx* four-cleft, superior. *Corol* none. *Styles* two. *Germ* semi-superior, one-celled, one-seeded; *attachment* inferior. *Nut* semi-quadrilocular, two-valved, one-seeded. *Embryo* inverse, with little or no perisperm.

1. J. *regia. Willd.* iv. 455.

*Leaflets* about nine, ovate-oblong, sub-serrate, nearly equal. *Fruit* globular.

*Beng.* Akroot.

*Arab.* Jown, or Shejir Jown.

*Sans.* Ukshad*u*, also K*u*ndural*a*.

A native of the mountainous countries immediately to the north and north-east of Hindoostan, on the plains of Bengal, it grows pretty well, but is not fruitful there.

2. J. *plerococca. Roxb.*

*Leaflets* from three to thirteen, lanceolate, smooth. *Panicles* axillary and terminal. *Nuts* unequally but amply winged.

Bol*u*s, the vernacular name in Silhet, where it is indigenous in the vast forests, which cover the hills to the north and east of that province; and grows to be a tree of considerable magnitude. The wood is of a light colour, and used by Turners. The bark thick, dark brown, possessing much tannin, and is reckoned by the natives, the best they are acquainted with for tanning. Flowering time May.

*Branchlets* scabrous, with little elevated, white specks.

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*Young shoots* clothed with minute, gold-coloured scales. *Leaves* alternate, sub-opposite, and abruptly pinnate, from six to twelve inches long. *Leaflets* from three to four, or from five to thirteen, short-petioled, obliquely lanceolate, obtusely acuminate, entire, firm and smooth, from three to six inches long, by one or two broad. *Petioles* round, when they first unfold, scaly like the other tender parts. *Panicles* axillary and terminal, shorter than the leaves; composed of many, filiform, simple male aments, and a few similar female ones, all are clothed with the minute yellow scales above mentioned. MALE FLOWERS. *Scales* of the ament solitary, one-flowered, scarcely to be distinguished from the pedicels, and clothed with the yellow scales just mentioned. *Calyx* four-leaved; *leaflets* roundish, concave, and so much separated as to appear in some measure four corollets. *Corol* none. *Filaments* twelve, very short, inserted on the base of the leaflets of the calyx. *Anthers* large, two-lobed. FEMALE FLOWERS. *Scales* of the ament, and calyx as in the male, only larger and more distinct, both are permanent; the former increasing. *Germ* inferior, turbinate, covered with little yellow scales, one-celled, containing a single ovulum, attached to the bottom of the cell. *Style* scarcely any. *Stigma* spread over the top of the germ, somewhat two-lobed, with the lobes rather lacerated. *Nut* round, very hairy, the size of a large pea, crowned with the permanent calyx, and resting in the enlarged scale of the ament, the three lobes of which are now increased into three long, lanceolate obtuse, scariose wings, the middle one of which, as in the germ, much larger, sometimes the inner margin of the scale is extended in the ripe state, into a two-lobed, short, broad wing, one-celled at top, which cell becomes four-lobed at bottom, (semi-quadrilocular,) two-valved; *valves* very hard. *Seeds* solitary, four-lobed. *Integument* single, thin, of a light brown. *Perisperm* conform to the seed, scanty, sebaceous. *Embryo* inverse. *Cotyledons* two, intricately folded up in the four lobes of the cell of the nut; when vegetation has advanced so

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far as to raise them above ground, they are deeply divided, nearly to the base, into two bifid segments. *Plumula* two-lobed. *Radicle* superior.

*QUERCUS. Schreb. gen. N.* 1447.

*Male calyx* generally five-cleft. *Corol* none. *Stamina* from five to ten, or more. *Female calyx* entire, rugged. *Corol* none. *Styles* from two to five. *Nut* more or less embraced by the permanent calyx. *Embryo* inverse, without perisperm.

1. Q. *fenestrata. R.*

*Leaves* petioled, lanceolar, entire, finely acuminate, firm and polished. *Spikes* panicled, terminal. *Flowers* tern; *male* dodecandrous. *Nut* hemispherical, all but the obtuse apex hid in the oblately spherical, muricated cup.

A large tree, yielding wood of a good quality, a native of the mountains in the vicinity of Silhet, where it is called *Kala chukma* by the natives. Flowering time October and November; the seed takes nearly one year to ripen.

*Young shoots*, and indeed all the other tender parts particularly smooth. *Leaves* alternate, petioled, narrow-lanceolar, entire, finely acuminate, firm and polished; from six to eight inches long, by one and a half broad. *Spikes* terminal, becoming lateral by the growth of the branchlets, very numerous, forming many crowded panicles about the ends of the twigs, by far the greatest number male, and more slender than the female ones, all are erect, or nearly so; *flowers* tern, *male* dodecandrous. *Involucre* composed of many small, acute scales. *Germ* inferior, three-celled, with two ovula in each attached to the top of their cell. *Style* three-cleft. *Nuts* subglobular, smooth, of a chesnut-colour, all except a small circular portion of the vertex completely covered by the spherical, slightly echinated, thin cup, as if peeping out at a small circular window. Hence the specific name.



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2. Q. *lanceæfolia. Roxb.*

*Leaves* short-petioled, lanceolar, entire, obtusely acuminate, firm and lucid. *Spikes* panicled, terminal. *Nuts* oval; cup in some completely covering the nut, in others variously split and covering more or less of its lower part only.

Shingra, the vernacular name in the Garrow country, where it grows to be a very large and useful timber tree; the wood light-coloured like the English oak, but harder, and reckoned one of their most durable timbers. Flowering time December; the seeds ripen in October.

*Young shoots* somewhat angular and perfectly smooth. *Leaves* alternate, short-petioled, lanceolar, tapering equally at each end, entire, acuminate, smooth, glossy, and hard; from five to six inches long by one and a half broad. *Stipules* ensiform, dropping before the leaves are expanded. *Buds* round, smooth, chesnut-coloured, and early formed in the axills of the leaves. *Panicles* axillary and terminal, composed of many, long, straight, simple spikes, with the rachis often ending in a scaly bud, which sometimes shoots into a branchlet. *Spikes* villous, the male ones most numerous, and below the female ones. *Male flowers* minute, generally solitary, though pretty much crowded. *Calyx* five or six-parted. *Segments* ovate, and downy. *Corol* none. *Filaments* from six to twelve, twice the length of the calyx, inserted round a convex, woolly gland in the centre. *Anthers* roundish. *Female spikes* on the same panicle with the male, but fewer and uppermost. *Flowers* always distinct, and less crowded. *Nut* of a rather long oval shape, thin, a little hairy, brown, the size of the common acorn, or rather longer. *Cup* thin, attached to the rachis laterally, rather rough on the outside, somewhat villous, sometimes forming a complete envelope for the nut, suffering the stigma to pass at a small perforation in the apex; in others it splits into two or three portions, and then embraces more or less of the nut. *Seed* conform to the nut, generally single; when two, they are so closely united as to seem a single seed with a double corculum in the apex. *Integu-*

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*ment* single, brown, adhering to the cotyledons, and entering deeply into them in various directions, in short acuminated, as in the nutmeg, &c. *Perisperm* none. *Embryo* conform to the seed, inverse, as in the other species.

3. Q. *lucida. Roxb.*

*Leaves* cuneate lanceolar, entire, and smooth. *Spikes* panicled; *male flowers* dodecandrous. *Acorns* round, nearly hid in the enlarged cup, which is marked with concentric belts on the outside.

A tree, a native of Pulo Pinang.

*Leaves* alternate, short-petioled, somewhat wedge-shaped, obtuse-pointed, entire and smooth in every part; about six inches long, and about two broad. *Stipules* small, subulate. *Spikes* terminal, very numerous, filiform, by far the greatest part bear only male flowers. MALE FLOWERS crowded. *Calyx* about six-cleft. *Stamens* about twelve, and two or three times longer than the calyx. *Pistillum* a woolly gland occupies its place. FEMALE FLOWERS more remote, and on separate spikes. *Calyx* with three, small, scale-like bractes, pressing on the underside. *Styles* three. *Seed* roundish, sunk in the much enlarged, pitcher-shaped, fleshy calyx, which is now surrounded with several coloured belts.

4. Q. *muricata. Roxb.*

*Tender parts* villous. *Leaves* oblong, entire. *Female spikes* axillary, and lateral, the length of the leaves. *Acorn* spherical, two-thirds hid in a turbinate, muricated cup.

A large timber tree, found by Mr. W. Roxburgh indigenous in the forests of Prince of Wales' Island.

*Young shoots* round, and clothed with short, very soft, brown pubescence. *Leaves* sub-sessile, narrow, oblong, entire, rather acute, villous; *veins* simple, and parallel; from four to six inches long, by one and a half broad. *Female spikes* lateral, about as long as the leaves. *Cup* turbinate,



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armed with many concentric rings of small inoffensive, acute points; hence the specific name.

5. Q. *turbinata. R.*

*Leaves* lanceolar, entire, obtusely acuminate, hard, glossy. *Spikes* terminal, generally paired; the lower part occupied by clusters of female flowers, and the upper part crowded with male ones. *Nuts* turbinate, smooth; *cup* small, rugose.

Bansooa Batana, the vernacular name in Chittagong, where it grows to be large tree, but its wood is used for fuel only. It flowers in May; and the acorns ripen about the close of the rains.

*Young shoots* void of pubescence, but somewhat scabrous with small white specks. *Leaves* short-petioled, lanceolar, entire, obtusely acuminate, of a very hard texture, and glossy, from five to six inches long, by one and a half or two broad. *Spikes* terminal, rigid, simple, crowded with numerous, minute, male flowers on the exterior half; and female hermaphrodite ones in detached clusters over the lower half. *Male calyx* five-toothed, woolly. *Corol* none. *Filaments* from ten to fifteen, much longer than the calyx. *Anthers* oval. *Germ* none, but a conical gland in its place. FEMALE HERMAPHRODITE. *Involucre* large, downy, scaly. *Perianth* superior, small, downy, about six-toothed. *Filaments* about as many as in the male, shorter than the styles, intermixed with much white hair. *Anthers* small, probably quite abortive. *Germ* three-celled, with one ovulum in each attached to the top of the cell. *Style* short but thick, and giving support to the calyx and stamina. *Stigmas* three, cylindric, spreading a little. *Nut* turbinate, smooth, of the size of a chesnut, light brown; *cup* small, embracing only the narrow base of the nut, rugose. *Embryo* inverse, as in the genus.

6. Q. *acuminata. R.*

*Leaves* oblong and broad-lanceolar, entire, smooth. *Spikes* axillary, solitary, simple. *Nuts* ovate, smooth. *Cup* saucer-shaped, prickly.

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Kanta gola Batana, the vernacular name in Chittagong, where it grows to be a large and useful timber tree. It flowers in May, and the acorns ripen about the close of the rains.

*Young shoots* somewhat villous. *Leaves* short-petioled, broad-lanceolar, entire, acuminate, smooth on both sides, from six to twelve inches long, by three or four broad. *Female spikes* axillary, solitary, shorter than the leaves, villous, the upper three-fourths occupied with distinct female flowers. *Involucre* large, hoary, imbricated upward with acuminate scales. *Perianth* minute, five-toothed. *Germ* broad-ovate, three-celled, with one ovulum in each, attached to the top of the cell. *Style* short. *Stigma* three, cylindric. *Nut* ovate, smooth, brown, rather longer than the common acorn. *Cup* saucer-shaped, echinate, with short projecting sharp prickles, embracing about one-fourth part of the nut only. *Embryo* inverse, as in the genus.

7. Q. *lappacea. Roxb.*

*Leaves* lanceolar, entire, much acuminated, downy underneath. *Spikes* axillary, solitary. *Nut* ovate, villous, slightly embraced by the inoffensive, echinate, saucer-shaped cup.

*Ooloo* chukma, the vernacular name in Silhet. On the hills which bound the north side of the province, it grows to be a large tree, and furnishes the natives with strong wood in colour like that of the common oak, but of a harder texture and close-grained. Flowering time December; the seeds ripen in the September following.

*Young shoots* densely clothed with very soft down. *Leaves* alternate, short-petioled, lanceolar, entire, much acuminated, nearly smooth above, tomentose underneath, from six to eight inches long, by about two broad. *Stipules* very downy, and falling early. *Spikes*, or *aments*, axillary, solitary, nearly as long as the leaves, slender, very downy, some entirely and densely covered with small yellowish, downy, male flowers, others equally crowded with male ones, at the apex and a few remote at the base, the rest or middle part, occupied by

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the female flowers only. *Bractes* solitary, under each flower, small, downy. MALE FLOWERS. *Calyx* five-parted, downy. *Corol* none. *Filaments* generally ten, inserted round a woolly gland, two or three times longer than the calyx. *Anthers* two-lobed. FEMALE FLOWERS. *Involucre* armed with numerous, incurved, soft, hairy, pretty long, echinate spines, which increase in size with this organ, and give to the cup a fierce appearance, though soft and innocuous; they may be compared to the common bur;—hence my specific name. *Calyx* hoary; *mouth* four, five or six-toothed. *Style* short. *Stigma* three, cylindric. *Nut* ovate, of the size of a large filbert, villous, crowned with the permanent calyx and style. *Cup* saucer-shaped, echinate, rather soft, hairy. *Seed* comform to the nut, as in Q. *robur*, *Gært. Sem.* i. 183. *t.* 37.

8. Q. *squamata. Roxb.*

*Leaves* broad-lanceolar, entire, somewhat acuminate, coriaceous and glossy. *Spikes* axillary and terminal, often compound, the terminal ones panicled. *Cups* growing together, massy, rough and scaly, embracing slightly the base of the hemispherical, hard, glossy nut.

Bura chukma, is the vernacular name in Silhet. A large timber tree, a native of the Garrow mountains, where it blossoms in February and ripens its seed in September and October. The wood is lighter coloured than that of the English oak, but seems equally strong, and is fully as close in the grain.

*Young shoots* perfectly smooth. *Leaves* alternate, short-petioled, from oblong to lanceolar, tapering most toward the base, obtusely acuminate, entire, smooth, having the upper surface glossy, particularly hard and firm, from six to seven inches long, by about three broad. *Petioles* smooth, flat on the upper side, about half or three-fourths of an inch long. *Spikes* numerous, both axillary and terminal, the whole forming a large panicle which is often larger than the leaves, and very hoary; in or near the centre, one or more of the spikes

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more robust, and shorter; such, so far as I have observed, bear female flowers only, they are in more remote fascicles of three each; the small spikes are longer, and have the little bundles of flowers longer, and much nearer to each other. *Bractes* broad-ensiform, under each of the little bundles of flowers. *Male calyx* of about six, unequal, very woolly scales. *Filaments* twelve, three times longer than the calyx, smooth. *Anthers* oval. *Germ,* in the centre of the insertion of the filaments is a very woolly gland. *Female calyx* as in the genus, and like the male one very woolly. *Nut* in shape not far removed from hemispheric, being nearly truncated at the base, and there rather above an inch in diameter, polished, dark brown, very hard, one-celled. *Cup* saucer-shaped, hard, having its surface imbricated with small pointed scales. *Seed* solitary, conform to the nut, as in the genus.

9. Q. *ferox. Roxb.*

*Leaves* ovate-lanceolate, and oblong-acute, entire, glossy. *Male spikes* pointed; *flowers* with a six-cleft calyx, and twelve stamina. *Cup* an entire evalvular capsule, armed with many compound thorns, hiding completely the sub-ovate acorn.

A large timber tree, a native of the Chittagong mountains. Flowering time the beginning of the hot season; the seed ripens in July and August.

*Young shoots* void of pubescence, but marked with lighter coloured specks. *Leaves* alternate, petioled, oblong and broad-lanceolar, acuminate, entire, firm and glossy; from three to six inches long, by from one to three broad. *Spikes* terminal, panicled, long and slender; the *male* ones many, the *female* ones few. *Male flowers* minute, collected into small globular, approximate bundles over the long filiform spikes. *Calyx* six-cleft, villous. *Filaments* twelve, twice the length of the calyx. *Anthers* oval. *Nut* sub-ovate, of the size of a filbert, smooth, completely covered by the entire, evalvular capsule-like cup, or involucre which is powerfully armed all

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over the whole of the outside, with strong, sharp, compound spines; and lined with a little sericeous pubescence.

10. Q. *armata. R.*

*Leaves* lanceolate, acuminate, entire, smooth. *Cup* an entire, evalvular capsule, armed with many compound thorns, hiding completely the sub-ovate acorn.

A large timber tree, a native of the mountainous countries immediately east of Bengal. At Chittagong, it is called *Kanta-lal batana;* at Tippera *Singhara;* and in the forests near Gwalpara, *Kanta Singur.*

11. Q. *castanicarpa. R.*

*Leaves* oblong, entire, smooth. *Nuts* ovate, a little hairy, completely hid in the evalvular, capsule-like cup, which is completely armed with numerous, ramous, sharp spines.

Lumba kanta hurina batana is the vernacular name at Chittagong, where it grows to be a large tree, with many far-extended branches. It flowers in July and August, and the acorns, which are small, ripen in the cool season. The leaves in this are very large, generally about a foot long, and from four to five inches broad.

12. Q. *glomerata. R.*

*Leaves* elliptic, entire, polished on both sides. *Female flowers* on long, terminal, glomerate spikes. *Acorn* ovate, smooth, half hid in the tubercled cup.

A large tree, found in the forests of Pulo Pinang by Mr. W. Roxburgh; male flowers not seen.

13. Q. *depressa. Roxb.*

*Acorns* depressed, with the remains of the large style in the middle of the concavity. *Cup* flat, with a thick, callous margin, and five, concentric, imbricated lamella underneath.

An immense tree, a native of the forests of Pulo Pinang. It differs from Louriero's Q. *concentrica,* in the depressed shape of the acorn and cup.

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14. Q. *lamellata. R.*

*Acorns* much flattened, but convex at both ends, and hidden in the round cup, which is imbricated with ten or twelve, concentric lamella.

A native of the forests of Pulo Pinang.

15. Q. *semiserrata. R.*

*Leaves* petioled, lanceolar, firm and lucid, anterior margins serrate; *veins* simple and parallel. *Female flowers* in axillary pairs. *Nuts* oval, acuminate, smooth, of a chesnut colour, base only embraced by the saucer-shaped, thick, belted, villous cup.

A large timber tree, a native of the mountains in the vicinity of Silhet, where it is called Ramkatha; there it flowers about the beginning of the hot season, and the seed ripens in August.

*Bark* of the young shoots smooth, lucid green, except when just unfolding, thin, clothed with a soft, ferruginous, woolly substance. *Leaves* scattered about the ends of the twigs, petioled, lanceolar, with the anterior margin remotely and acutely serrate, the apex acute, the texture hard, and polished, and the *veins* simple and parallel, from four to eight inches long, by one to three broad. *Petioles* about an inch long, smooth. *Female flowers* axillary, paired and sessile. *Involucre* composed of from five to six, concentric, incurved, villous lamina. *Nuts* oval, pointed, smooth, of a chesnut colour, the size of a large olive; a small portion of the base only is embraced by the thick, hard, villous, saucer-shaped cup. *Embryo* inverse, without perisperm, as in the genus.

16. Q. *serrata. Willd.* iv. 431.

*Young shoots* densely clothed with ferruginous down. *Leaves* oblong, lucid, hoary underneath, parallel-veined, most acutely gross-serrate. *Spikes* terminal, male and female mixed.

Gol-Shingra the vernacular name in the Silhet district be-



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tween Silhet and the river Brahmunputra, where it grows to be a large, and like the most of the other species, natives of that mountainous tract, a useful timber tree. Flowering time, the end of the rains.

In this species the young shoots are very completely cloathed with much soft, dark brown down. The leaves very hard, with very numerous, simple, and parallel veins, each terminating in a sharp serrature like those of *Dillenia speciosa*; some few are now and then sharply laciniate, even lobate.

*Spikes* terminal, sub-panicled, consisting of only a few distinct male and female, downy aments. *Male flowers* with a five-leaved calyx, and from ten to twelve stamina; *female* ones as in the other species. The acorn I have not yet seen.

17. Q. *incana. Roxb.*

*Leaves* cordate-oblong, firm, remotely and acutely serrate, smooth above, hoary underneath. *Male aments* panicled, shorter than the leaves; *flowers* pentandrous. *Acorns* ovate-oblong, half hid in a sub-rotund, scaly, tubercled cup.

A large timber tree, a native of the mountains of Kamaoon, Almora, and other countries north of the plains of Hindoosthan. A short account of the tree is given by Col. Hardwicke in his Journey to Shreenagur. *Asiat. Res.* vi. 374.

*Young shoots* hoary. *Leaves* alternate, short-petioled, oblong, with a cordate base, acute, remotely and acutely serrate, of a rigid texture, smooth above, hoary underneath, from three to six inches long, and from one to two broad. *Stipules* and *bractes* linear-lanceolate, membranaceous, caducous. *Male aments* filiform, numerous, forming small, terminal, or axillary panicles. *Calyx* from four to five-cleft, and ciliate. *Stamens* from four to eight. *Female peduncles* axillary, lateral or terminal, very short, from one to many-flowered, three seems the most common number. *Stigma* three-cleft. *Nut* ovate-oblong, smooth, with a villous apex, crowned with part of the remaining style. *Cup* roundish, imbricated with small tubercled scales.

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*CASTANEA. Schreb. gen. N.* 1448.

*Male calyx* none. *Corol* five-petalled. *Stamina* from ten to twenty. *Female calyx* from five to six-leaved, muricate. *Corol* none. *Germ* inferior, three-celled; *cells* one-seeded; *attachment* inferior. *Stigmas* penciliform. *Nuts* from one to three, inclosed in the echinate involucre. *Embryo* inverse, without perisperm.

1. C. *Indica. Roxb.*

*Leaves* oblong, acute, mucronate-serrate, polished above, hoary underneath. *Aments* sub-terminal, panicled. *Flowers* polygamous.

Nikari, the vernacular name in Silhet.

A small tree, a native of the hilly frontier districts east of Bengal. It flowers during the months of November and December, and the seed ripens in from eight to ten months afterwards. The kernels are eaten by both natives and Europeans, and may be compared to indifferent filberts.

*Trunk* tolerably straight, growing to such a size as to admit of the wood, which is of a good quality, being used for various purposes. *Branchlets* downy. *Leaves* alternate, short-petioled, from oblong to broad lanceolate, acute, grossly mucronate-serrate, polished on the upper surface, soft with brownish down underneath; *veins* simple, parallel, and equal in number with the serratures, each ending in the sharp points thereof, from four to eight inches long, by from two to four broad. *Stipules* ensiform. *Aments* or spikes, terminal and axillary, panicled, alternate, filiform, downy, those with male flowers more numerous, those with hermaphrodite few and thicker, of an offensive smell. MALE FLOWERS collected in small bundles over the spikes. *Calyx* generally six-leaved; *leaflets* oval, very woolly. *Filaments* twelve, longer than the calyx. *Anthers* round-oval. *Hermaphrodite flowers* generally solitary, and scattered over every part of their spikes, rarely any male flowers with them. Sometimes two



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or even three come together, and are then surrounded by the same scaly calycle, or involucre to be mentioned under the next article. *Calyx* superior, its parts as in the male, with the base closely embraced on all sides by numerous hairy scales. The most exterior of which are broad; the inner ones are subulate points which become the capsule or spinous envelope of the seed. *Filaments* twelve, alternately shorter, the long ones six, about the length of the calyx. *Anthers* oval, two-lobed. *Germ* inferior, three-lobed, three-celled, with one ovulum in each, attached to the bottom of its cell. *Styles* three, a little recurved. *Stigma* simple, obtuse. *Fruit* from round to obovate, completely armed with ramous spines, as in C. *vesca*, one-celled, not opening by regular valves, but bursting without order when the seed is ripe. When two or more hermaphrodite flowers are found crowded so close as to press on each other, those when come to maturity, have only one common capsule, or envelope. *Nuts* oval, of a pretty hard, ligneous texture, and light brown colour, somewhat hairy, particularly round the apex. Inside soft and hairy, one-celled, evalvular. *Seed* generally single, conform to the nut. *Integument* single, thin, striated, and hairy. *Perisperm* none. *Embryo* the size and figure of the seed, inverse. *Plumula* two-lobed. *Radicle* oval, superior.

2. C. *pumila. Willd.* iv. 461.

*Leaves* oblong, acute, mucronate, serrate, tomentose underneath.

*Chin.* Fing lot.

From Canton in China, it has been introduced into the Botanic garden at Calcutta, where its growth is uncommonly slow, and though it has been there many years, it shows no tendency to blossom.

*SAGITTARIA. Schreb. gen. N.* 1441.

*Male calyx* three-leaved. *Corol* three-petalled. *Stamina*

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from six to twenty-four. *Female (Hermaphrodite, R.) calyx* and *corol* as in the male. *Germ* and *seeds* numerous. *Embryo* conduplicate, without perisperm.

1. S. *sagittifolia. Willd.* iv. 408.

*Leaves* sagittate, acute; *lobes* narrow, straight and acute. *Scape* simple. *Flowers* tern.

A native of the borders of sweet water lakes, ditches, &c. in the vicinity of Calcutta, where it flowers in February, March, and April.

*Root* consisting of numerous, spongy fibres, from a crown, formed by the united leaves, the centre one thicker, and ending in the half putrid remains of the small round tuber, or bulb, which gave existence to the plant, while from its sides many suckers run a few inches, each ending in a small, round bulb, which in due time produce other plants. *Leaves* radical, the first of the young plants linear, uncommonly slender, and very acute, the next one or two simply cordate-oblong, the rest with angular, spongy petioles of different lengths, and sagittate, acute, smooth, with the barbs or posterior lobes, from two to three-nerved, and rather longer than the single, five-nerved, narrower and much more acute, in fact, ensiform upper portion, about six inches long; *petioles* from six inches to two feet long. *Scapes* simple, as long as the leaves, columnar, spongy. *Flowers* pure white, pedicelled, uniformly tern, the inferior three, and sometimes the second, or a part thereof female, the rest male. *Bractes* tern, triangular, one-flowered, shorter than the pedicels. *Calyx* and *corol* as in S. *sagittifolia* of Europe, only the latter is pure white throughout. *Filaments* in the male flowers, about twenty-five, shorter than the ovate-oblong, yellow anthers. In the female none, but some few, abortive germs are found in the disk of the former. *Germ* in the female flowers very numerous, &c. as in S. *sagittifolia, Gært. Sem.* ii. 21. *t.* 84, but the *embryo* in our Indian plant is of a pale greenish yellow colour.

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Dr. Smith observes, in his description of S. *sagittifolia*, that it discharges a white milky juice, a rare circumstance in an aquatic plant. Our Bengal plant yields nothing of the kind; whether this is a sufficient ground for considering ours to be a distinct species, I will not presume to say, but must observe, that I cannot discover any other difference. I do not find that any use is made of the bulbs in Bengal.

2. S. *obtusifolia. Willd.* iv. 409.

Polygamous. *Leaves* reniform, sagittate-obtuse, lobes long, taper and acute. *Scape* ramous, and verticelled; *flowers* hexandrous.

Culi tamara. *Rheed. Mal.* xi. *t.* 45.

A native of standing sweet water, or slow running rivers. It flowers during the cold season.

*Root* fibrous, annual. *Leaves* radical, erect, long-petioled ovate-sagittate; *apex* circular, *lobes* or barbs divaricate, tapering to long, narrow, fine points, smooth, many-nerved; from six to twelve inches long, and from four to eight broad. *Petioles* from two to three feet long, thick, one side flat, the other angular. *Scapes* including the flower-bearing part from two to four feet high, erect, from five to six-angled, striated, the lower verticel, and sometimes the second, bear branches mixed with the one-flowered pedicels. *Involucre* at each verticel three-fold, sessile, conical. *Flowers* numerous, small, white. *Male flowers* for the most part terminal, peduncled; *peduncles* slender. *Calyx* three-leaved. *Corol* three-petalled. *Filaments* six, below they are enlarged, so as to occupy the whole of the centre of the flowers. *Anthers* two-lobed. *Hermaphrodite flowers*, for there are no male flowers, at least I have never found any, more numerous below, robust, peduncled. *Calyx* and *corol* as in the male. *Filaments* six, with their enlarged bases surrounding the germs. *Germs* about thirty, sessile. *Stigma* two-lobed, bearded, or downy. *Drupes* numerous, collected on a globular receptacle, turbinate, dry, wrinkled. *Nut* one-seeded,

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but there are also two empty cavities, one in each side of the seed. *Seed* bent double, with the two extremities pointing to the base, by one of which it is affixed to the bottom of the drupe.

3. S. *cordifolia. Roxb.*

Polygamous. *Leaves* cordate; *scapes* simple. *Stamina* from six to twelve.

Grows in standing sweet water, in the vicinity of Calcutta; flowering time the latter part of the rains.

*Root* fibrous, annual. *Leaves* radical, long-petioled, round cordate, apex circular; behind deeply divided into two broad, somewhat pointed lobes, margins entire, smooth on both sides, many-nerved, about two inches broad, and less than three long. *Petioles* sheathing at the base, their length depends much on the depth of the water; tapering, somewhat angular, smooth. *Scapes* about as long as the petioles, like them ending in an oblong raceme, of from five to eight flowers. *Bractes*, or *involucres*, three-fold, to the lower three there are always two hermaphrodite flowers, and three to the rest, one of which is generally male. HERMAPHRODITE FLOWERS. *Calyx* and *corol* as in the genus. *Filaments* generally from nine to twelve inserted round the base of the germs. *Anthers* cordate. *Germs* numerous, compressed. *Style* short. *Stigma* simple. *Capsules* from three to four hundred, much compressed on a globular naked receptacle, surrounded with a deeply dentated margin, in each a single seed, bent double, as in S. *obtusifolia.* MALE FLOWERS. *Calyx* and *corol* as above. *Stamens* from six to ten, surrounding a few abortive germs.

*BEGONIA. Schreb. gen. N.* 1442.

*Male calyx* none. *Corol* four-petalled, two opposite, larger. *Stamina* numerous. *Female calyx* none. *Corol*

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four, or many petalled. *Capsules* inferior, winged, or lobed, three-celled, many-seeded.

1. B. *malabarica. Dryand. in Trans. of Linn. Soc.* i. *p.* 171.

Caulescent, herbaceous. *Leaves* unequally cordate, while young acutely serrulate-dentate; *peduncles* axillary, many-flowered; *capsule* without wings, four-lobed, four-celled.

Tsjeria narenampuli. *Rheed. Mal.* ix. *t.* 86.

Ram totee, the vernacular name at Chittagong, where it is indigenous, in moist cool vallies. Plants from thence have been received into the Botanic garden at Calcutta, where they continue in flower the whole year, but chiefly in the rains. The natives of Chittagong, where the plant is plenty, use the leaves as a pot-herb; when fresh the taste is pleasantly acid, not unlike sorrel.

*Root* perennial, succulent, throughout a pretty deep red. *Stems* herbaceous, several from the same root, sub-erect, from six to twelve inches high, succulent, round, jointed, and rather swelled at the joints, marked with numerous, small lanceolar ferruginous, rather elevated specks, while young hairy. *Leaves* alternate, petioled, unequally or rather sub-semi-cordate, acuminate, harsh with a few short, stiff hairs, with the margins, particularly while young, acutely and unequally serrulate-dentate, and minutely curled, from six to eight inches long, by four or five broad. *Petioles* rather shorter than the leaves, round, hairy and marked with ferruginous specks like the stems. *Stipules* oblong, stem-clasping. *Peduncles* axillary, short, bifid, many-flowered. *Flowers* pretty large, particularly the female ones, drooping, of a very pale pink, indeed almost white, sparkling, as if frosted; sweetly fragrant. *Bractes* round the base of the pedicels, minute. *Male calyx* none. *Petals* four, in opposite pairs, sub-rotund, the inner pair rather smaller by the size of a thin margin, which in the large pair, forms a sharp, vertical rim round the unexpanded globular flower bud. *Filaments* from sixty to eigh-

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ty, very short. *Anthers* long, clavate, opening with a long slit on opposite sides. *Female calyx* none. *Corol* as in the male, but larger. *Stamina* none. *Germ* inferior, smooth, and thickly spotted with red, four-lobed, four-celled; each cell containing two reniform receptacles, attached to the middle of the axis, ovula innumerable over every part of the receptacles. *Style* four, bifid, yellow; *segments* or *stigma* spiral like the horns of a ram.

2. B. *laciniata. R.*

Caulescent, erect, hairy. *Leaves* unequally cordate, laciniate, serrulate-dentate. *Peduncles* the length of the petioles, few-flowered. *Capsule* with one large, oval, obtuse wing.

*Beng.* Hooirjo.

A native of the Garrow hills, and the eastern frontier of Bengal. Flowering time the rainy season, the seeds ripen in November.

*Root* fibrous. *Stem* simple, rather succulent, about biennial, first erect, afterwards more or less procumbent, hairy, jointed; from six to eighteen inches long, and as thick as a ratan. *Leaves* alternate, long-petioled, unequally cordate, acutely laciniate, margins serrulate-dentate, and ciliate; from three to six inches long and broad. *Stipules* oblong. *Peduncles* axillary, solitary, about as long as the leaves, from two to six-flowered, and generally more than half of them male. *Bractes* like the stipules, but smaller. *Corol* four-petalled, cruciate-oval within, ferruginous on the back. *Male stamina* numerous, inserted on a conical receptacle, clavate. *Filaments* rather short. *Female germ* inferior, oval, with two narrow and one broader wing, and for the most part only two-celled, each containing numerous ovula, attached to two jugiform receptacles in each cell, rising from the axis, as in Gærtner's *Mussaenda frondosa*. *Style* scarcely any. *Stigma* large, variously convolute. *Capsule* oblong, three-winged; but two of them so narrow as scarcely to be observed if not



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carefully looked for, the third broad oval, and obtuse, three-celled, as in the germ.

3. B. *aptera. R.*

Shrubby, sub-parasitic. *Leaves* semi-cordate, entire, smooth. *Capsules* wingless.

Found by Colonel Hardwicke on the Island of Mauritius. He says it is a large spreading shrub.

*Stem* rather slender, and mostly growing out of decaying, or rotten trunks of fallen trees, in wet shaded woods. *Peduncles* axillary, solitary, bifid, each division three-flowered; the middle one larger, sessile, and male; the other two short-pedicelled, and female. *Calyx* none. *Corol, stamina, &c.* as in the genus; only the *capsules* are destitute of wings.

## MONOECIA MONADELPHIA.

### *NIPA. Schreb. gen. N.* 1696.

*Male spathe; corol* six-petalled. *Anthers* six pair round the apex of a single filament. *Female spathe; corol* none. *Fruit* compound. *Nuts* or *drupes* angular, one-seeded.

N. *fruticans. Willd.* iv. 597. *Thunb. Act.* 1782. *p.* 231.

Nypa. *Rumph. Amb.* i. *t.* 16.

*Beng.* Goolga Gucina, or Gubna.

Cocos *nypa. Lourier. Cochin Ch.* 694.

Grows on the lower parts of the Delta of the Ganges, and in salt swamps.

### *PINUS. Schreb. gen. N.* 1456.

*Male flowers* in clusters. *Calyx* of several scales, or of four leaves, *(Linn.) Corol* none. *Stamina* many. *Female calyx*, scales of the strobiles two-flowered. *Corol* none. *Pistil* one. *Seed* membrane-winged.

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1. P. *longifolia. Willd.* iv. 500.

*Leaves* three-fold, filiform, from twelve to eighteen inches long, pendulous, with the margins a little scabrous. *Cones* ovate, shorter than the leaves, scales with thick recurved apices. *Anthers* crowned.

*Hind.* Chur the name of the tree, and Surul the wood.

In gardens about Calcutta a few small trees of this species are found, all from Nepal or from the mountains north of the plains of Bengal, and Oude, or reared from seed from thence, where they are found on the stupenduous mountains, growing to an immense size. There they blossom about the beginning of the hot season.

*Trunk*, I have observed above, that the trees about Calcutta are small, but in Nepal, I am informed they grow straight to upwards of an hundred feet in height; the bark is scabrous. The *branches* verticelled, and rather few in number than otherwise, so that here the head is thin, of a roundish form, and yields little shade—I mean the trees about Calcutta. *Leaves* three-fold, disposed in approximated spiral rows round the end of the branchlets, perfectly filiform; margins somewhat hispid, when the finger is drawn backward, generally pendulous, and from nine to eighteen inches or more in length. *Stipules* or *sheaths*, round the base of the leaves, numerous and chaffy. MALE FLOWERS. *Antheral racemes* numerous at the extremities of the branchlets, from their centre issue the shoots of the same season. *Bractes* solitary, one to each raceme. *Flowers* very numerous. *Filaments* scarcely any. *Anthers* clavate, opening on each side, and crowned with a large roundish scale, inflexed over the next above.

2. P. *Devdara. R.*

*Branches* drooping. *Leaves* in approximated fascicles of about forty, rigid, acute. *Strobilus* erect, oval; *scales* thereof appressed, thin, smooth, even-edged, transversely elliptic. *Cotyledons* ten.



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Devadaroo, or Devdar, is the name the tree is known by amongst the natives where it grows.

A tree of great size, a native of the mountains north of Rohilcund. It differs from P. *Larix* in many respects, but most conspicuously in being destitute of the bractes which project beyond the scales of the strobile or cone.

*Leaves* in approximate clusters of about forty, straight, three-sided, rigid and acute. *Male aments* scattered between the fascicles of leaves, at first oval, but lengthening with age, imbricated with numerous bi-antheriferous scales with dilated incurved apices. *Filaments* no other than the just mentioned scales of the aments. *Anthers*, an oblong one-celled one, on each side of the narrow inferior part of the scales. *Strobile* or *cone* erect, peduncled, oval, obtuse, of the size of a pullet's egg. *Scales* thereof transversely elliptic, or broad reniform, concave with a thin, smooth, even edge, they remain from their broad concave structure, so close as in general to prevent the escape of the seeds without help.

The tree is so exceedingly replete with resin, as to yield a very large proportion of tar. A manufactory of that article was lately begun, near the skirts of the Almora mountains by Mr. Gott.

Extract of a letter from that Gentleman, (Mr. Gott,) dated Kosupoor, 2nd November 1804, describing the Devdar pine.

"The only account I can give you of the Devdar pine, is from a variety of enquiries I have at times made of the natives. It grows a very considerable distance within the hills, none less than six days' journey, for a native. It does not appear to delight in a situation on the summit of mountains; on the contrary it grows in valleys, and most abundantly in plains, on the side of large, or tops of small hills that are but little exposed. Its height is described to exceed twenty feet, and its bulk in proportion, from four to five feet in diameter; it grows very straight, and as regularly tapering as a fishing rod, with branches down to the ground.

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*CUPRESSUS. Schreb. gen. N.* 1458.

*Male calyx*, the scales of the ament. *Corol* none. *Anthers* four, sessile, without filaments. *Female calyx*, the scales of the aments one-flowered. *Corol* none. *Styles* none. *Stigma*, concave dots. *Strobile* with angular nuts.

C. *sempervirens. Willd.* iv. 511.

*Leaves* imbricated; *twigs* quadrangular.

*Chin.* Yeum Fa.

*Hind.* Sarass.

The upright variety is a native of China, and of the northern mountains of India, and Persia. It does not thrive on the plains of Bengal.

*THUJA. Schreb. gen. N.* 1457.

*Male calyx*, the scales of the ament. *Corol* none. *Stamina* four. *Female calyx* the scales of the ament, two-flowered. *Corol* none. *Pistil* none. *Nut* one girt with a membranaceous wing.

T. *orientalis. Willd.* iv. 509.

*Strobiles* squarrose, with sharp scales. *Branchlets* ancipital.

*Chin.* Piem Fa.

From China it has been introduced into our garden in India, where it rarely grows to more than eight or ten feet in height, is very ramous, and spreads nearly as much as its height.

*PHYLLANTHUS. Schreb. gen. N.* 1412.

*Male calyx* from four to six-leaved, or from four to six-parted. *Corol* none. *Nectary* from four to six scales. *Stamina* various. *Female calyx* and *nectary* as in the male. *Germ* superior, generally three-celled; *cells* two-seeded, at-

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tached to the upper end of the axis. *Capsule** three-celled; *cells* two-seeded. *Embryo* inverse, and furnished with a perisperm.

SECT. I. *With simple Leaves.*

1. P. *madraspatensis. Willd.* iv. 575.

Annual, erect. *Leaves* alternate, narrow-cuneate. *Flowers* axillary; *male* monadelphous; *anthers* three pair.

*Teling.* Nala userekee.

Is common, with P. *Niruri*, in gardens, and cultivated ground. Plants constantly succeed one another, and flower most part of the year.

*Root* annual, though sometimes it lives out the second year. *Stem* straight, in the oldest plants somewhat woody, from one to four feet high, round, smooth, above very ramous. *Branches* sub-erect, often twiggy in large plants. *Leaves* on the stem scattered; on the branches alternate, bifarious, spreading, sessile; in a good soil those on the stem are linearly lanceolate, the rest wedge-formed, smooth, entire, somewhat pointed, from half an inch to two inches long, and from one-eighth to half an inch broad. *Stipules* two, lateral at the cordate base, pointed, withering. *Flowers* axillary, always one female, and from two to four or five males, all are short-peduncled, but the male shortest, in the flowering time erect, afterwards the male drops, and the female is bent down. *Male calyx* six-leaved. *Nectary* six-scaled. *Filaments* single. *Anthers* three pair round its apex. *Female calyx* and *nectary* as in the male. *Capsule* three-celled, six-valved, with two seeds in each cell.

Taste herbaceous, with some degree of astringency. Cattle eat it.

2. P. *simplex. Willd.* iv. 573.

Perennial, diffuse, branches flattened. *Leaves* bifarious,

* In many of the species it is a very perfect *berry.*

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lanceolate. *Female flowers* long-peduncled; *male* sessile. *Anthers* three pair. *Female nectary* a twelve-toothed capsule.

*Teling.* Uchi userekee.

Like the last, it is a native of dry cultivated ground; but by no means so common. It flowers during the wet and cold seasons.

*Root* frequently perennial. *Stem* somewhat woody, oblique. *Branches* numerous, diverging from the base of the little stem, spreading closely to the earth, with their apices ascending, many times longer than the stem, striated from the insertions of the leaves, which gives them a compressed appearance. *Leaves* simple, alternate, spreading, bifarious, sessile, linearly lanceolate, smooth, entire; about three-fourths of an inch long, and one-fourth broad. *Stipules* two, obliquely-cordate, withering. *Flowers*, male and female mixed, axillary, generally from one to three of each. The female ones long-peduncled. The male ones nearly sessile. *Calyx* as in the last species, except that in this, there are three distinct filaments, united at the base; and the female nectary is twelve-notched.

*Note.* This plant agrees so well with Retzius's P. *simplex*, that I dare say, they are the same; he may have changed König's name, or König himself may have changed it from *simplex* to *depressa*.

The natives use the fresh leaves, flowers and fruit, with common seeds, and sugar, of each equal parts, made into an electuary, for the cure of gonorrhœa; a tea-spoonful is given twice a day. The fresh leaves bruised and mixed with butter milk, make a wash to cure the itch in children.

3. P. *gracilis. R.*

Perennial, erect, virgate. *Leaves* bifarious, oblong and cuneate-lanceolate. *Filament* single, capsule three-cleft.

*Teling.* Userekee.

A rare, somewhat shrubby plant, growing under the shelter of other bushes, and trees. Flowering time the end of the rainy season.

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*Root* perennial. *Stem* scarcely any, when present erect, woody, smooth. *Branches* numerous, erect, twiggy. *Leaves* alternate, bifarious, short-petioled, wedge-formed, oblong, or even obcordate, pointed, rounded, or emarginate, entire; from half an inch to an inch long, and about a quarter of an inch broad. *Stipules* cordate, acute, membranaceous. *Flowers* axillary, as in P. *madraspatensis* from which it differs only in being shrubby; whether soil and situation can make the change is with me uncertain; if it can, they are only varieties of the same plant.

4. P. *obcordatus. R.*

Shrubby, erect. *Leaves* simple, alternate, sub-sessile, obcordate cuneate. *Flowers* axillary, peduncled, one female, and two or more male; with a six-leaved calyx. *Filament* single. *Anthers* six.

A native of Bengal. Flowering time the close of the rains, and cold season.

*Trunk* straight, suffruticose. *Branches* ascending. *Bark* of the woody parts, deep brown, of the tender shoots smooth, green, height of the whole plant about three feet. *Leaves* simple, alternate, sub-sessile, obcordate, cuneate, smooth on both sides, about half an inch long, and considerably less in breadth. *Stipules* semi-cordate, membranaceous. *Flowers* axillary, uniformly one female and several male, all are short-peduncled, and drooping. *Calyx* six-leaved, or six-cleft to the base, alternately smaller, expanding, green, permanent. *Nectary*, none in the female. In the male six minute glands in the fissures of the calyx. *Stamina*, none in the female. In the male, the filament is single, and short. *Anthers* three pair, round the top of the filament. *Pistillum* no rudiment of any in the male. In the female it is round. *Styles* three, short, spreading with stigmas, slightly two-toothed. *Capsules* round, three-celled, three-valved, of the size of a grain of black pepper, smooth. *Seeds*, two in each cell.

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5. P. *retusus. R.*

Shrubby, dioecous. *Leaves* obovate, cuneate, sub-retuse. *Flowers* axillary, crowded; *male* pentandrous. *Calyces* five-leaved. *Berries* pendulous, pure white, six-seeded.

A stout, ramous, shrubby species, a native of Bengal, in flower and fruit, in all stages, the whole year.

*Trunk* scarcely any thing distinct, that can be so called; but several woody, very ramous branches, rise from the root, which spread in all directions; *young shoots* ribbed; and void of pubescence. *Leaves* simple, alternate, short-petioled, obovate-cuneate, rounded at the apex, truncated, or retuse, smooth on both sides, about an inch long, and not so much broad. *Stipules* obliquely triangular, withering. *Flowers* axillary, crowded, minute, pedicelled; the males on one plant, and females on another; when the petals expand the pedicels are considerably lengthened. *Male calyx* five-leaved; *leaflets* oval, concave. *Filaments* five, distinct, of the length of the calyx, alternate with five nectarial scales round the three-cleft, abortive pistil. *Female calyx* as in the male. *Nectary* a slender membranaceous ring round the base of the germ. *Germ* round, three-celled, with two ovula in each, attached to the axis from the middle upwards. *Style* scarcely any. *Stigma* trifid, segments spreading, cuneate, bidentate. *Berries* round, very pure white, smooth, of the size of a small pea, succulent, three-celled. *Seeds* two in each cell, or in all six, separated into pairs by pulpy partitions. *Integuments* two; the exterior one thin, and white; the inner one nuciform, and beautifully pitted. *Embryo* inverse, and curved like the back of the seed. *Cotyledons* two, linear-oblong. *Radicle* sub-cylindric, superior.

It is at all times a handsome shrub, but when its numerous pure white, pendulous berries are ripe, it then becomes particularly conspicuous.

This as well as *Phyllanthus virosus* might better be referred to Willdenow's *Fluggea*, see his edition of the *Sp. Pl.* iv. *p.* 757. but according to what I have observed in his only



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species, *leucopyrus*, formerly *Phyllanthus leucopyrus*, as well as in this and *virosus*, his essential character of the genus will require a little alteration, viz. *Stylus tripartitus*, *Bacca sex-sperma;* all the three are perfectly dioecous; pentandrous, with a five-leaved calyx; no corol, but an acetabuliform nectary; and a round, pure white, succulent, six-seeded berry. The seeds are separated into pairs, by thin pulpy partitions, and are furnished with a perisperm, and a curved inverted embryo.

6. P. *leucopyrus. Kön. Mss.*

Dioecous, shrubby, armed. *Leaves* obovate. *Flowers* axillary, male pentandrous. *Berry* dry, six-seeded.

Fluggea *leucopyrus.*

A large, poor-looking, rambus shrub, a native of the dry barren forests of Coromandel. It flowers chiefly during the rainy season.

*Trunk* erect. *Branches* numerous, very rigid, spreading in every direction round the trunk. *Bark* ash-coloured. *Thorns* scattered, in a bad soil more numerous, horizontal, large, leaf flower-bearing, they may be called spinous-pointed branchlets. *Leaves* scattered, short-petioled, obcordate, smooth, entire. *Stipules* minute, oval, obtuse. *Flowers* on separate bushes, the female on one, the male on another. In both they are axillary, crowded, peduncled, and very small. *Male calyx* five-leaved, *leaflets* concave. *Corol* none. *Nectarial* glands five, alternate with the insertion of the filaments. *Filaments* five, longer than the calyx. *Anthers* oval. *Pistil* nothing but a three-cleft column. *Female calyx* as in the male. *Germ* globular. *Style* scarcely any. *Stigmas* three, spreading, two-cleft. *Berry* of the size of a grain of pepper, smooth, dry, three-celled. *Seeds* two in each cell.

*Note.* The parts of fructification, and its bearing the male flowers on one tree, and female on another, make it, in these respects, nearly agree with P. *virosus*, but the thorns, disposition of the branches, and leaves declare it a distinct species.

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7. P. *virosus. Willd.* iv. 578.

Dioecous, sub-arboreous, unarmed. *Leaves* elliptic and oval. *Male flowers* axillary, crowded, pentandrous. *Berries* succulent, white, pendulous, six-seeded.

Up among the Circar mountains, where this chiefly grows, it is frequently a middle sized tree. In the forests of the low countries, it is much smaller, or only a large shrub. It flowers during the hot, and beginning of the wet season.

*Trunk* erect. *Bark* rust-coloured. *Branches* numerous, ascending; *branchlets* bifarious. *Leaves* simple, alternate, bifarious, short-petioled, oval, entire, smooth, from one to two inches long, and from half an inch to an inch broad. *Stipules* minute. *Flowers* very small. This species is dioecous, the male flowers having always been found on a separate tree from the female. In both they are axillary, crowded, short-peduncled, when in flower erect. *Male calyx*, or *corol* five-leaved; *leaflets* oblong, concave. *Nectary* five yellow glands surrounding the base of the style. *Filaments* five, spreading, inserted between the nectarial glands; *anthers* simple. *Pistil* only a style-like column in the centre with a stellate top. *Female calyx* as in the male. *Nectary* a five-sided ring surrounding the base of the germ. *Germ* ovate. *Styles* three. *Stigma* two-cleft. *Berry* the size of a pea, covered with a white, fleshy pulp, three-celled. *Seeds* two in each cell.

The bark is a strong astringent, and possesses the power of intoxicating fish, when thrown into the water, where they are; which like the berries of *Menispermum cocculus*, renders them easily taken.

SECT. II. *Leaves pinnate.*

8. P. *Niruri. Willd.* iv. 583.

Annual, erect. *Leaflets* oval. *Flowers* axillary, peduncled, one or two male, and one female. *Capsules* smooth, three-celled.



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Kirganeli. *Rheed. Mal.* x. *t.* 15.

Urinaria *Indica. Burm. Zeyl. t.* 93.

*Hind.* and *Beng.* Sada-hazur munee.

*Teling.* Nella userekee.

A common weed in gardens, and on dry cultivated lands, or such as have been lately cultivated.

*Root* annual. *Stem* erect, from one to two feet high, round, smooth. *Branches* numerous, in large plants the lower spreading to a considerable extent. *Leaves* scattered, spreading, pinnate, from one to three inches long, flower-bearing. *Leaflets* alternate, bifarious, nearly sessile, oval, smooth; about half an inch long, and one-fourth broad. *Stipules* of the petioles three-fold, forming a three-toothed cup round their insertion, each tapering to a fine point; those of the leaflets similar, but one on each side. *Flowers* leaflet-axillary, generally one or two male, and one female, short-peduncled, after flowering time the male drops, and the female droops. *Male calyx* six-leaved. *Corol* none. *Nectary* small, saucer-formed, six-toothed. *Stamens*, one short, columnar filament. *Anthers* three pair. *Female calyx* and *nectary* as in the male. *Capsules* smooth, umbilicated, opening with an elastic jerk, three-celled, six-valved; *cells* two-seeded.

The root tastes bitter, and astringent. The Rev. Dr. John informs me, that he has known the fresh root prove an excellent remedy for the *Jaundice*. About half an ounce, while fresh, was given, rubbed up in a cup of milk, night and morning, the cure was completed in a few days without any sensible operation of the medicine.

9. P. *urinaria. Willd.* iv. 583.

Annual, erect. *Leaflets* linear-oblong. *Flowers* sessile in the exterior axills; *female* solitary in the inferior. *Capsules* scabrous.

Tsjeru Kirganeli. *Rheed. Mal.* x. *t.* 16.

*Beng.* and *Hind.* Hazar munee.

*Teling.* Yerra userekee.

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This when young is like *Niruri*, grows under the shade of trees. It flowers during the wet and cold seasons.

*Root* generally annual, though in some soils bi-and even perennial. *Stem* erect, striated, of a pale reddish colour. *Branches* several, ascending, striated from the insertions of the stipules. *Leaves* scattered, spreading, pinnate, from one to two inches long, flower-bearing. *Leaflets* alternate, linear oblong, entire, smooth, three quarters of an inch long, and one quarter broad. *Petioles* compressed, somewhat triangular. *Stipules* of the petioles three-fold, acute, membranaceous; those of the leaflets two, lateral. MALE FLOWERS, exterior leaflets axillary, two or three sub-sessile. *Calyx, nectary*, and *stamens* as in *Niruri*. FEMALE FLOWERS, lower leaflet axillary, solitary, sessile. *Calyx* and *nectary* as in the male. *Germ* somewhat murexed, coloured. *Capsule* scabrous, three-celled, six-valved. *Seeds*, two in each cell, transversely striated on the outside.

*Note.* It is immediately distinguished from P. *Niruri*, by its sessile flowers, and scabrous capsules. Young plants are deeply tinged with dark, dull red. Cattle eat it. The taste herbaceous.

10. P. *bacciformis. Willd.* iv. 582.

Biennial, diffuse. *Leaflets* remote, pointed, fleshy. *Male flowers* monadelphous. *Female* terminal. *Berries* six-seeded.

*Teling.* Rawa-sala-burta-kada.

This species is very common in pasture ground near the sea, on the Coromandel coast. It flowers all the year round.

*Root* biennial. *Stem* or *branches* several, spreading close to the ground, angular, coloured, sometimes woody near the base, from one to two feet long. *Leaves* alternate, spreading, pinnate, flower-bearing, from two to three inches long. *Leaflets* from two to six pair, alternate, remote, oval, somewhat fleshy, pointed. *Stipules* of the petioles three-fold; of the leaflets two-fold. MALE FLOWERS few, in the axills of the inferior leaflets, short-pedicelled. *Calyx* six-leaved; *leaflets*

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round, laciniate. *Nectary* saucer-shaped, six-parted. *Stamens* a turbinate body in the centre of the nectary, is surrounded by three pair of anthers. FEMALE FLOWERS single in the axills of the exterior leaflets, short-pedicelled. *Calyx* six-leaved, the three interior leaflets ovate, acute. *Germ* turbinate, truncate. *Styles* three, spreading. *Stigmas* three-cleft. *Berry* ovate, of the size of a pea, three-celled, six-valved; *cells* two-seeded.

11. P. *pendula. Roxb.*

Biennial. *Leaves* long, pendulous, leaflets from ten to fifty pair. The *male flowers* round, in the inferior axills; the *female* ones solitary in the exterior ones.

*Teling.* Tella userekee.

A most beautiful, somewhat shrubby, erect species, when young not unlike *Niruri*, a native of the same places, but very rare. Flowering time the latter part of the wet season.

*Stem* biennial, or more, straight, round, smooth. *Bark* green. *Branches* alternate, the inferior ones diverging and long; the superior ones ascending and short; all like the stem, and in old plants twiggy. *Leaves* scattered, nearly pendulous, filiform, pinnate; from four to nine or ten inches long, flower-bearing. *Leaflets* from ten to fifty pair, alternate, short-petiolate, broad-lanceolate, acute, coloured round the edges, smooth, entire; the lower ones are about a quarter of an inch long, and one eighth broad, the exterior ones much smaller. *Petioles* filiform, flexuose, angular. *Stipules* of the petioles three-fold, those of the petiolets two-fold. MALE FLOWERS spiked, in the axills of the lower leaflets. *Spikes*, when the leaves are young, they scarcely appear, a single flower with the rudiments of one, two or three more, is all that can then be seen, but in old leaves they are very conspicuous, depending, half as long as the leaflets, imbricated with four rows of acute, permanent membranaceous, one-flowered bractes. *Calyx, nectary* and *stamens*, as in *Niruri.* FEMALE FLOWERS solitary, from the axills of the exterior leaflets, short-peduncled. *Calyx*, and *nectary*, as in *Niruri.*

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*Note.* A very large proportion of the female flowers are barren. The taste is herbaceous, with a considerable degree of stypticity.

12. P. *rhamnoides. Willd.* iv. 580.

Shrubby. *Leaflets* oval. *Male flowers* often racemed, and in the inferior axills; *female* solitary, no nectary.

A small shrub, a native of cultivated land, amongst other shrubs, on the coast of Coromandel.

*Stem* scarcely any. *Branches* many, erect, smooth; *young shoots* angular from the running down of the insertions of the leaves. *Leaves* scattered, spreading, pinnate, flower-bearing, from three to five inches long. *Leaflets* from five to ten pair, alternate, short-petioled, spreading, broad-oval, the exterior ones largest, soft, below whitish, entire, from half to three-fourths of an inch long, and from one-fourth to half an inch broad. *Petioles* angular, *Stipules* of the petioles three-fold, of the leaflets two-fold. MALE FLOWERS racemed. *Racemes* single, from the lower axills, sessile, bowing, imbricated, as in P. *pendula.* *Flowers* very long pedicelled, depending. *Nectary*, six scales on the middle of the leaflets of the calyx pointing inwards, before the flower expands, these cover the anthers like so many hoods; when the leaves are young there appear only one, two or three flowers, and no raceme, but in old leaves it is as conspicuous as in P. *pendula.* FEMALE FLOWERS in the upper axills, single, short-peduncled, bowing. *Calyx* six-leaved; *leaflets* large. *Nectary* none. *Germ* three-horned. *Styles* from the horn of the germ, and not from the centre, each two-cleft. *Stigmas* revolute. *Capsule* globular, of the size of a large pea, crowned with the remaining *styles* and *stigmas*, as in P. *bacciformis*; three-celled, as in the other species.

It is to be distinguished from P. *pendula*, by the general habit of the shrubs, by the length of the leaves, by the form of the leaflets, and lastly by the male flowers having long pedicels; in that there they are sessile.

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13. P. *petiolaris. R.*

Shrubby. *Leaves* pinnate; *leaflets* about five pair, subrotund, smooth and entire. *Female flowers* on the common petioles.

A native of the Circar mountains, where it grows to be a stout, ramous shrub.

14. P. *multiflorus. Willd.*

Shrubby, climbing. *Leaflets* oval. *Flowers* of both the sexes with five-leaved calyces, and five-scaled nectaries. *Berries* from ten to twelve-seeded.

*Hind.* and *Beng.* Panjooli.

Niruri. *Rheed. Mal.* x. *t.* 27.

*Teling.* Nella-pooroogoodoo.

Phyllanthus *tinctorius. König's Mss.*

A large straggling, or climbing shrub, common in hedges and amongst bushes on the banks of water courses. It flowers most part of the year.

*Trunk* scarcely any thing that can be so called, but many, very long, straggling, stout, woody branches, running through amongst, and over other shrubs, to a very great extent. *Bark* rust-coloured. *Leaves* scattered, spreading, pinnate, flower-bearing; from three to five inches long. *Leaflets* alternate, oval, entire, covered with a very little down; about three quarters of an inch long, and half an inch broad. *Stipules* of the petioles three-fold; those of the leaflets two-fold. *Flowers* leaflet-axillary, small, white, generally one female, and two or more males in the same axill, peduncled, at the flowering time erect, sometimes there is also a small axillary raceme of male flowers, and at others the common petioles end in a raceme. *Male calyx* five-leaved, leaflets oval. *Nectary* five glands placed on the junctures of the leaflets of the calyx. *Filaments* three, unequal; that in the centre is erect, large and bears three anthers; the other two lateral ones are filiform, oblique, and bear one anther each. *Female calyx* and *nectary* as in the male. *Styles* one. *Stigmas* minute, in

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number corresponding with the cells of the berry. *Berry* depressed, umbilicated, dark purple, succulent, from eight to twelve-celled. *Seed*, one or two in each cell, placed one above the other.

15. P. *vitis idæa. Kön. Mss.*

Sub-arboreous. *Leaves* bifarious; *leaflets* oval. *Flowers* axillary. *Calyx* six-toothed, no nectaries, no style. *Berries* succulent.

Katou Nirouri. *Rheed. Mal.* v. *t.* 44.

*Beng.* Kumkata Joolee.

Yerra pooroogoodoo of the Telingas.

This is one of the most common of the family; it is found wild in every part of India, and seems to thrive well in all soils and situations; but amongst the mountains, it grows to be a tree; whereas in the low lands it is generally a large shrub. It flowers and produces fruit all the year round.

*Trunk* when a tree, very straight. *Branches* spreading horizontally. *Branchlets* flexuose, bifarious. *Leaves* alternate, bifarious, pinnate, flower-bearing, from five to eight inches long. *Leaflets* alternate, oval, entire, smooth, about an inch long and three-fourths broad. *Petioles* round, flexuose, smooth. *Stipules* of the petioles three-fold, acute, those of the leaflets two-fold. *Flowers;* the male ones from the exterior axills, from two to three-petioled; the female ones from the lower axills, solitary, petioled, at the flowering time erect. *Male calyx* campanulate, margin six-notched; *segments* rounded, inflexed. *Nectary* none. *Filaments* single, clubbed. *Anthers* from three to five affixed to the club by their backs. *Female calyx* one-leaved, small, closely surrounding the lower half of the germ, slightly six-notched. *Nectary* none. *Germ* globular. *Styles* none. *Stigmas* three. *Berry* red.

The wood is white, hard and durable. The hill people employ it for various economical uses. Cattle eat the leaves. In drying for the hortus siccus, they always become very



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black. It is frequently employed for ornamental hedges in gardens, for which end it is well chosen, as its thick, ever green foliage, and constant succession of beautiful red berries, gives it a pretty appearance.

16. P. *turbinatus. Kön. Mss.*

Arboreous. *Leaves* bifarious; *leaflets* oval. *Flowers* axillary, peduncled, the male beyond the female. *Calyx* six-toothed. *Berry* hid in the enlarged coloured *calyx*, six-seeded.

Parin Nirouri. *Rheed. Mal.* v. *t.* 43.

*Teling.* Dawadaree.

This is a most beautiful species, a large tree growing upon and amongst the mountains of Orissa. It flowers during the hot season.

*Trunk* erect. *Bark* rust-coloured. *Branches* spreading, horizontal, numerous. *Branchlets* bifarious. *Leaves* alternate, bifarious, pinnate, flower-bearing, about six inches long. *Leaflets* alternate, short-petioled, oval, smooth, entire, about an inch long, and three quarters of an inch broad. *Petioles* round, flexuose. *Stipules* of the common petiole cup-formed, three-toothed, withering; those of the leaflets two, lateral, acute. *Flowers* leaflet-axillary, peduncled. MALE FLOWERS below the female ones, occupying the lower axill, erect in the flowering time. *Calyx* one-leaved, campanulate; mouth six-notched. *Corol* none. *Nectary* none. *Filament* single, clubbed. *Anthers* generally three, though sometimes more, oblong, affixed by their backs to the club of the columnar filament. FEMALE FLOWERS above the male, occupying the middle leaflets; in the flowering time erect, afterwards drooping. *Calyx* as in the male, increasing with the germ, and acquiring a beautiful mixture of red and yellow. *Nectary* none, except the flat crown of the germ be such. *Germ* turbinate, truncate, and somewhat six-lobed. *Style* short, three-parted. *Stigmas* two-cleft. *Berry* sitting in the centre of the enlarged coloured calyx, of the size of a large pea, three-celled; *cells* two-seeded.

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17. P. *patens. R.*

Shrubby. *Branches* spreading, bifarious. *Leaves* bifarious, alternate, pinnate with twelve or more alternate, short-petioled, oval leaflets in each side. *Flowers* leaflet-axillary; the *female* ones solitary, the *male* ones fascicled in the lower axills. *Berries* erect in the rotate, permanent calyx.

A native of Chittagong, and from thence introduced by Mr. William Roxburgh, Jun. into the Botanic garden, where it is in flower all the year, and a very ornamental shrub it is.

*Trunk* erect. *Branches* spreading, with numerous approximated, alternate, bifarious, horizontally spreading branchlets. *Bark* of the woody parts dark brown; that of the young parts smooth, deep green. *Leaves* alternate, bifarious, pinnate, spreading, from four to eight inches long. *Leaflets* on each side from five to fifteen, alternate, short-petioled, oval, entire, smooth on both sides, dark green, a little more than half an inch in general length. *Stipules* of the petioles forming a three-toothed cup; those of the leaflets two, semicordate, acuminate. MALE FLOWERS in the axills of the lower leaflets, several together, very fine-peduncled, drooping under the leaves. *Bractes* minute. *Calyx* turbinate, scarcely half the length of the calyx. *Anthers* six or three pair, linear, affixed longitudinally to the club of the filament. FEMALE FLOWERS in the axills of the middle leaflet, the exterior ones being without flowers, solitary, short-peduncled, drooping while in blossom. *Calyx* flat, with a border of six reniform, permanent segments. *Berry* erect on the spreading, enlarged, coloured calyx, three-lobed, smooth, succulent, of the size of a pea, three-celled. *Seeds*, two in each cell.

It is much like P. *vitis idæa*, but in addition to the difference which the description points out, specimens of this species retain their colour when dry, whereas those of *vitis idæa* become remarkably black.



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18. *tenellus. Roxb.*

An erect, delicate, small shrub. *Leaves* pinnate; *leaflets* from eight to ten pairs, oval. *Flowers* axillary, peduncled; one female and several pentandrous male ones; in both a five-leaved calyx, and five-scaled nectary. *Capsule* three-celled, six-valved, with two seeds in each cell. Introduced from the Mauritius in 1802, by Captain Tennant.

*Trunk* a single, straight, ligneous twig, of three and a half feet in height, with a few still more delicate, erect branches, from the whole plant, which is now five years old. *Leaves* pinnate, alternately scattered round the stem and branches, diverging from two to three inches long. *Leaflets* from six to ten pair, alternate, oval, smooth, and entire; about half an inch long. *Stipules* tapering, acute, those of the common petiole three-fold, those of the leaflets two-fold. *Flowers* two-fold, in the axills of the leaflets, generally one longer peduncled female one, and several shorter peduncled male ones, opening in succession, pale pink, exceeding minute; particularly the male ones. *Male calyx* of five, orbicular leaflets. *Nectary* of five, roundish scales, alternate with the leaflets of the calyx. *Filaments* five, alternate with the nectarial scales, and shorter than the calyx. *Anthers* oval. *Female calyx*, leaflets five, oblong. *Nectary* as in the male. *Capsule* minute, oblate spherical, three-celled, six-valved. *Seeds*, two in each cell. *Perisperm* in considerable quantity; pale, fleshy. *Embryo* inverted, and curved, the two subulate cotyledons point to the lower angle, and the radicle to the apex across the umbilicus.

19. P. *Kirganelia. Willd.* iv. *p.* 587.

Shrubby. *Leaves* pinnate, with from twelve to thirty pair of alternate, oblong leaflets. *Flowers* axillary, peduncled, several monadelphous male, and one female flower together, in both calyx five-leaved, and nectary of five glands. *Berries* many-seeded.

A native of the Mauritius, from thence introduced into the

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Botanic garden at Calcutta by Captain Tennant in 1802; where it blossoms the whole year, but rarely ripens its seed in Bengal.

*Trunk* distinct, straight, and about as thick as a man's wrist; covered with rough, dark greenish, ash-coloured bark. *Branches* numerous, spreading far; the smaller have their extremities often drooping, and covered with smoother bark than the trunk. Height of the now five-year-old shrubs about eight feet, and expanding much more. *Leaves* alternate, pinnate, from four to six inches long. *Leaflets* from ten to thirty pair, alternate, from oblong elliptic, to lanceolate. *Stipules* thin at the base of the common petioles; and in pairs at the insertion of the leaflets. *Flowers* axillary, several male, and generally one female, very small, reddish. *Calyx* in both of five oblong, concave leaflets. *Nectary* in both five separate glands, within and alternate with the leaflets of the calyx. *Male filament* a single column, dividing into three, four or five, each furnished with a two-lobed anther. *Female germ* ovate, from three to five-celled, with two seeds in each, attached to the top of the axis. *Style* scarcely any. *Stigmas* from three to five, deeply two-cleft; *segments* long, taper, and variously bent, but always spreading back over the germ. *Berries* small, round, dark red, succulent, from three to five-celled. *Seeds* two in each cell, but all seldom come to maturity. *Embryo* inverse, curved and furnished with a perisperm.

A stout handsome shrub, loaded with abundance of delicately small, ever-green foliage. The flowers are too small to add to its beauty, except when narrowly inspected.

20. P. *reclinatus. Roxb.*

Shrubby, scandent, with reclinate branchlets, and leaves. *Leaves* pinnate, floriferous; *leaflets* many, alternate, oval-oblong, with a few male flowers in the lower axills, and one female in the exterior. *Filament* columnar. *Capsule* depressedly turbinate.

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* A large, shrubby, somewhat climbing plant; a native of Sumatra, and brought from thence to the Botanic garden by Mr. William Roxburgh, in 1803, where it flowers during the rains chiefly.

*Trunk* scarcely any, but many long, straggling or climbing, woody branches, clothed with dark brown, smooth bark; *branchlets* reclinate, round, smooth, and green. *Leaves* pinnate, and reclinate, from twelve to thirty-six inches long. *Leaflets* from six to twenty pair, alternate, short-petioled, ovate-oblong, entire, smooth, about an inch and a half long, and less than one inch broad. *Stipules* of the leaves threefold; those of the leaflets paired. *Flowers* leaflet-axillary, generally several, small, yellow, the male ones in a few of the lowermost axills, and one smaller, shorter peduncled, green female one in the exterior. *Male calyx* turbinate, one-leaved, with a contracted, six-toothed mouth, teeth alternately smaller, and incurvate. *Filament* single, columnar, clavate, with six linear, two-lobed anthers round its upper two-thirds. *Female calyx* six-toothed; teeth rounded. *Germ* turbinate, three-celled, with two seeds in each. *Styles* scarcely any. *Stigmas* three, triangular, incurvate. *Capsule* compressed, turbinate, of the size of a pea, smooth, red, three-celled, three-valved, each valve separating into two, from the case upwards as in *Bradleia.* *Seeds* two in each cell, angular, integuments three; the exterior one a complete, soft, orange-coloured aril; the second, hard, thick and black; the interior one membranaceous. *Perisperm* conform to the seed. *Embryo* inverse, curved. *Cotyledons* oblong. *Radicle* cylindric, superior.

21. P. *strictus. R.*

Shrubby, straight. *Leaves* pinnate; *leaflets* firm, ovate oblong to lanceolate. *Racemes* axillary; *male calyx* one-leaved; *female* deeply six-parted. *Capsule* berried.

* A native of the Malay Islands, to the eastward of the Bay of Bengal.

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*Stem* straight, woody; *branches* few and erect, particularly while young. *Bark* of the stem dark brown; the height of the plants in ten years, and they have been full grown for some years, about eight feet. *Leaves* alternate, pinnate, horizontal, or drooping, from six to twelve inches long. *Leaflets* numerous, alternate, short-petioled, broad-lanceolate, entire, smooth, about two inches long, and scarcely one broad. *Racemes* leaflet-axillary, sessile, solitary, short, imbricated with small, cordate, pointed bractes. MALE FLOWERS more numerous than the female ones, peduncled, drooping. *Calyx* one-leaved, peltate, fleshy; border crenulate; in the centre are six semi-circular, incurved, fleshy scales, from a triangular excavation, in which the stamens are lodged. *Filament* single, short, three horned. *Anthers* double, at the extremity of each of the horns of the filaments. FEMALE FLOWERS on the same raceme with the male, and of nearly of the same size. *Calyx* six-parted to the base; *divisions* sub-orbicular, coloured on the inside. *Nectary* none. *Germ* turbinate, truncated. *Styles* three, spreading, each two-cleft. *Capsule* size of a large cherry, smooth, of a beautiful pale rose colour, three-celled, three-valved; *valves* fleshy. *Seeds*, two in each cell, black, rounded at the base, pointed at top, covered on the inside with a white fleshy aril, and by it affixed to the central receptacle.

22. P. *Emblica. Willd.* iv. 587.

Arboreous. *Leaves* bifarious; *leaflets* numerous. *Flowers* axillary, and below the leaves. *Calyx* six-leaved. *Drupe* with a three-celled nut.

Emblica *officinalis. Gært. Sem.* ii. 122.

Nilicamaram. *Rheed. Mal.* i. *t.* 38.

*Sans.* Amlaki. See *Asiat. Res.* iv. 308.

*Hind.* Amlae.

*Beng.* Amla.

*Tam.* Nellekai.

Myrobalana *Emblica* of the *Materia Medica.*

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*Teling.* Userekee.

A pretty large tree, found cultivated in most parts of India, and also wild in forests. Flowers during the beginning of the hot season; fruit ripe in eight or nine months after.

*Trunk* generally crooked, when large as thick as a man's body. *Branches* thinly scattered in every direction; male branches spreading and drooping. *Bark* ash-coloured, scabrous. *Leaves* alternate, spreading, bifarious, pinnate, flower-bearing, from one to two feet long, and about one and a half or two inches broad, leaflets very numerous, alternate, linear obtuse, entire, smooth, about three-fourths of an inch long, and one-eighth broad. *Petioles* striated, round. *Stipules* small, withering. *Flowers* minute, greenish yellow. MALE FLOWERS very numerous in the axills of the lower leaflets, and round the common petiole below the leaflets, peduncled. *Calyx* six-leaved. *Filament* single. *Anthers* from three to five surrounding the upper part of the columnar filament. FEMALE FLOWERS few, solitary, sessile, mixed with some males in the most exterior axills that bear flowers. *Calyx* as in the male. *Nectary* cup-formed, embracing half the germ, border ragged. *Germ* superior, ovate. *Style* scarcely any. *Stigmas* three, two-cleft, segments a little two-cleft. *Drupe* fleshy, globular, smooth, six-striated. *Nut* obovate, obtusely triangular, three-celled. *Seeds* two in each cell.

The wood of this tree is hard and durable particularly under water. The bark is strongly astringent; the natives employ it to cure diarrhœas, and to tan leather. The fruit is at all times full of exceedingly sharp juice; it is eaten raw by the natives, although to an European, the taste is disagreeably acrid. They are pickled, and made into preserve with sugar, and also baked in tarts; by these means they are more reconcilable to our taste.

23. P. *longifolius. Jacq. Hort. Schonb.* ii. *p.* 36. *t.* 194.

Arboreous. *Leaflets* ovate. *Racemes* drooping. *Calyces* four-leaved. *Male flowers* tetrandrous. *Drupe* with a four-celled nut.

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Cicca disticha. *Willd.* iv. 332.
Neli pouli. *Rheed. Mal.* iii. *t.* 47, 48.
Cheramela. *Rumph. Amb.* vii. *t.* 33. *f.* 2.
*Beng.* Loda, Nori.
*Hind.* Hurpurori, also Chelmeri.
Averrhoa acida. *Linn. sp. pl.* 613.
*Eur.* Cheramella.
*Teling.* Russa Userekee.

An elegant small tree, common in gardens, where it is reared for the sake of the fruit; I never saw it wild. It flowers about the beginning of the hot season.

*Trunk* tolerably straight, but short. *Branches* numerous, spreading in every direction. *Bark* ash-coloured, deeply cracked. *Leaves* approximated, numerous, scattered round the extremities of the branchlets, pinnate, often flower-bearing, from one to two feet long. *Leaflets* numerous, alternate, short-petiolate; the largest about the middle of the leaf, the lowermost nearly orbicular, gradually lengthening to oblong; smooth, entire, waved; from one to three inches long, and from one to one and a half broad; sometimes there are male flowers in the axills of the exterior leaflets. *Stipules* of the petioles three-fold, those of the petiolets two, very minute. *Petioles* round, smooth, tapering, sometimes ending in a short, glomerate raceme of male flowers. *Racemes* numerous, terminal; axillary and from the old germs over the naked branchlets. *Peduncles* flexuose, round, smooth. *Flowers* exceedingly numerous, small, reddish, collected into globular heads over the raceme; also frequently in the axills of the leaflets, and sometimes round the common petioles below the leaflets; *male*, *female* and *hermaphrodite* mixed. *Bractes* three-fold, at every bundle of flowers. *Male flowers* by far the most numerous. *Calyx* of four orbicular, spreading, concave leaflets. *Corol* none. *Nectary* four glands between the insertions of the petals. *Filaments* four, erect, shorter than the corol, anthers two-lobed. *Hermaphrodite* and *female flowers* mixed with the male ones, but fewer. *Corol* and



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*nectary* as in the male. *Stamens* generally wanting, though there are sometimes one or two, seldom more, and unlike those of the male. *Germ* superior, ovate. *Style* scarcely any. *Stigmas* from three to four, spreading, two-cleft. *Drupe* fleshy, from three to four-lobed, generally four, from six to eight-grooved, of the size of a gooseberry, which they are not unlike. *Nut* from three to four-parted, each part one-celled, and one-seeded.

This has much affinity with the *Phyllanthi*, particularly *Emblica;* the Telingas, though no great Botanists, are sensible of it, and call many of them, with this, by the same family name, *Userekee.*

The fruit of this species is more esteemed then that of *Emblica.* The natives therefore call it *Russa Userekee.* They are universally used as an article of food, either raw or dressed in various fashions, also pickled or made into preserves.

24. P. *tetrandrus. R.*

Shrubby. *Leaves* pinnate; *leaflets* numerous, lanceolar. *Flowers* leaflet-axillary, crowded, filiform pedicelled; *male calyx* four-leaved, and tetrandrous; *female* five.

Angrua, the vernacular name in Silhet where it is found, a small ramous shrub, common in the forests of that country; it blossoms in April and May, and the seed ripens in September.

*Young shoots* clothed with a small portion of ferruginous pubescence. *Leaves* alternate, and alternately pinnate; lengthening to two feet by the time they are full grown. *Leaflets* numerous, alternate, expanding in succession, short-petioled, broad-lanceolar, entire, smooth, from two to four inches long. *Petioles* round, villous. *Stipules* triangular, two to each petiole and petiolet. *Flowers* leaflet-axillary, much crowded, filiform, pedicelled, minute, purple, generally male in the lower axills, and female in the superior, though sometimes reverse or mixed. *Bractes* numerous at the base of the filaments, collecting them into bundles. *Male calyx* four-leav-

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ed; *leaflets* ovate-lanceolate, laciniate. *Corol* none. *Nectary* four small, roundish, reniform scales alternate with the leaflets of the calyx. *Filaments* columnar, very short. *Anthers* four, linear-oblong, and placed transversely round the apex of the column. *Female calyx* five-leaved; *leaflets* broad-lanceolate, fringed. *Corol* none. *Nectary* a six-lobed, small, saucer-shaped body round the base of the germ. *Germ* three-lobed, three-celled, with two ovula in each, attached to the axis from the middle upwards. *Styles* three, but bifid, and spread over the apex of the lobes of the germ. *Stigma* simple. *Capsule* small, three-lobed, three-celled, six-valved. *Seeds* two in each cell, when all come to maturity. *Perisperm* conform to the seed. *Embryo* inverse, as in the genus.

*ACALYPHA. Schreb. gen. N.* 1461.

*Male calyx* from three to four-leaved. *Corol* none. *Stigmas* from eight to sixteen. *Female calyx* three-leaved. *Corol* none. *Styles* three, ramous. *Capsules* tricoccous.

1. A. *Indica. Willd.* iv. 523.

Annual, erect. *Leaves* ovate, serrate. *Spikes* longer than the petioles. *Involucre* cowled, and notched, containing from two to four female flowers.

Cupameni, and Wellia Cupameni. *Rheed. Mal.* x. *t.* 81. and 83.

*Beng.* Shwet busunta.

*Teling.* Moorkanda.

An annual, very common every where, particularly in gardens, where it is in flower all the year round.

*Stem* erect, from one to two feet high, branchy, round, smooth. *Leaves* scattered, petioled, ovate-cordate, three-nerved, serrate, smooth, about two inches long, and one and a half broad. *Petioles* as long as the leaves. *Stipules* small, subulate. *Spikes* axillary, generally single, peduncled, erect,



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as long as the leaves, many-flowered, crowned, with a body in the form of a cross, the base of which is surrounded with a three-leaved calyx, the arms of the cross are tubular, with their mouths fringed, from the base of the cross on one side, issues a style-like thread, with a fringed stigma. The body of the cross contains an ovate seed-like substance. MALE FLOWERS numerous, crowded round the upper part of the spike. *Calyx* four-leaved, leaflets cordate. *Filaments*, their number I could never ascertain, so exceedingly minute are they. FEMALE FLOWERS below the male, remote. *Involucre* cup-formed, with an opening on the inner side, striated, smooth, toothed, from two to four-flowered. *Calyx* three-leaved.

2. A. *ciliata. Willd.* iv. 522. *Vahl*, &c.

Annual. *Leaves* serrate. *Spikes* axillary, shorter than the petioles. *Involucres* notched, one-flowered, ciliate and hairy.

A rare species, but growing in similar soil with *Indica*. It is also like that, annual, and about the same size.

*Leaves* as in A. *Indica*, except that they are a little hairy. *Spikes* axillary. FEMALE FLOWERS. *Involucre* one-flowered, toothed, ciliated, hairy.

*Note.* The same terminal cross is to be found at the extremity of the spike in this species.

3. A. *pilosa. Willd.* iv. 525.

Annual, erect, hairy. *Leaves* long-petioled, cordate, serrate, three-nerved. *Spikes* axillary, as long as the petioles. *Involucre* cup-shaped, dentate, one-flowered.

A native of the Moluccas.

4. A. *amentacea. R.*

Dioecous, shrubby. *Leaves* long-petioled, ovate-cordate, taper-pointed, serrate, three-nerved. *Stipules* ensiform. *Spikes* axillary, as long as the petioles, the male amentace-

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ous. *Involucre* small, hairy, dentate, one-flowered. *Style* multifid.

A native of the Moluccas. It differs from König's A. *betulina* (in *Retz. Obs.* v. *N.* 85.) in having but one female flower in the involucre.

5. A. *chinensis. R.*

Annual, erect, very ramous. *Leaves* rhomb-ovate, crenate. *Involucres* cordate-crenate, on long axillary peduncles. *Male flowers* in a pedicelled head, from the involucre. *Capsules* muricated.

A native of China. From Canton it was sent to the Botanic garden, where it blossoms and ripens its seed during the rains; and perishes at the approach of the cool weather in December.

*Stem* erect, annual, very ramous, lower branches horizontal and nearly as long as the stem; the superior ones ascending; *cells* clothed with short, appressed, white hairs, one or two feet high. *Leaves* alternate, petioled, rhomb-ovate, crenate, obtuse, three-nerved, pretty smooth. MALE FLOWERS in a small, pedicelled head rising from the base of the involucre. FEMALE FLOWERS from two to three, sessile in the centre of the involucre, immediately about the male pedicel; they expand in remote succession. *Calyx* as in the genus. *Capsules* muricate, and hairy. *Seed, integuments, perisperm* and *embryo* as in A. *virginica, Gært. Sem.* ii. 116. *t.* 107.

6. A. *conferta. R.*

Annual. *Leaves* round-cordate, crenate. *Flowers* axillary, crowded, sessile. *Involucres* from three to four-parted, with from two to three female flowers, proliferous, the exterior one bears a minute head of male flowers. *Capsules* rugose.

A native of China, from thence introduced into the Botanic garden, where it grows, flowers freely, and ripens its seed during the hot season.

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*Root* annual. *Stem* with many, ascending, round, smooth branches, from twelve to eighteen inches high. *Leaves* long-petioled, round-cordate, obtuse-pointed, three-nerved, crenate, pretty smooth, from one to two inches long. *Involucres* axillary, crowded, sessile, proliferous, from two to three-flowered, from three to four-parted, segments narrow, entire, sub-ciliate. MALE FLOWERS most minute, purplish, collected in a minute head, which springs from the exterior involucre only, the whole including its little pedicel, shorter than the involucre. FEMALE FLOWERS two or three in succession, in each involucre. *Calyx* none, or too minute to be discovered. *Corol* none. *Germ* three-lobed, hairy. *Styles* two or three-cleft. *Capsules* rugose.

7. A. *cylindrica. Roxb.*

Annual, hairy. *Leaves* long-petioled, sub-ovate, obtusely serrate. *Spikes* axillary, solitary, sessile, lower part cylindrical with a one-flowered, deeply dentate, ribbed involucre, minute and male.

A native of the Mauritius, from thence brought to the Botanic garden at Calcutta, where it flowers and ripens its seed more or less the whole year, but chiefly during the rainy season.

*CROTON. Schreb. gen. N.* 1462.

*Male calyx* five-leaved, or five-parted. *Corol* five-petalled. *Stamina* various. *Female calyx* generally as in the male. *Corol* as in the male, or none. *Capsule* tricoccous.

1. C. *variegatum. Willd.* iv. 531.

Shrubby, erect. *Leaves* lanceolate, smooth, entire, generally pointed; male flowers with small, ragged, obversely reniform petals, and twenty or more distinct stamens. *Styles* three, undivided.

*Tsjera* maram. *Rheed. Mal.* vi. *t.* 61.

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Codiæum medium chrysosticton. *Rumph. Amb.* iv. *t.* 25. and 26. *f.* 2.

Phyllaurea *Codiæum. Lour. Cochin Ch.* 705.

This elegant, highly ornamental shrub, so far as I have been able to learn, is indigenous only on the Moluccas, and from thence was introduced into the Botanic garden together with the two varieties of the same species, hereafter to be mentioned, where they blossom about the beginning of the rains in June.

*Trunk* erect and short. *Bark* ash-coloured. *Branches* sub-erect; general height of the whole plant from three to six or eight feet. *Leaves* alternate, petioled, lanceolate, entire, polished on both sides, generally variegated with white or yellow; about six inches long, by one and a half broad. *Petioles* round, smooth, about an inch long. *Racemes* axillary, about as long as the leaves, and so far as I have yet seen, male on one raceme, and female on another. MALE FLOWERS collected in fascicles in pretty long, slender pedicels. *Calyx* five-parted; *divisions* sub-rotund. *Petals* five, somewhat triangular, variously notched, or ragged, shorter by half than the divisions of the calyx. *Nectarial glands* five, round the stamina, and alternate with the petals. *Filaments* from twenty to thirty, distinct, clavate. *Anthers* seven. FEMALE FLOWERS sub-sessile, solitary. *Calyx* urceolate, five-toothed. *Corol* none. *Nectary* a coloured glandular ring, round the base of the germ. *Germ* conical. *Styles* three, undivided, recurved. Besides the plain green-leaved plant, viz. *Codiæum medium chrysosticton*, we have also from the Moluccas *Rumphius's Codiæum crispum*, *t.* 26. *f.* 2. and his fifth variety, *Codiæum chrysoticton latifolium*, sometimes the variegation partakes of yellow, but red predominates. In this variety the leaves are larger, and tend to be wedge-shaped. The female flowers are short-peduncled, and have the style much shorter than in the first variety. It is a most elegant plant, and delights in the shades of large trees, where the colours are more varied, and brighter. All the varieties

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are readily propagated by laying. In the Botanic garden they have not yet perfected their seed.

2. C. *bractiferum. R.*

Shrubby. *Leaves* linear-oblong, smooth, entire. *Racemes* terminal, becoming lateral with an immense orbicular bracte at the base.

Codiæum silvestre. *Rumph. Amb.* iv. *t.* 27.

A native of the Moluccas.

3. C. *dioecum. R.*

*Leaves* alternate, long-petioled, oblong, with the base somewhat cordate. *Racemes* axillary, filiform, much longer than the leaves.

A native of the Malay Archipelago.

4. C. *bicolor. R.*

Shrubby. *Branches* proliferous. *Leaves* oblong, ventricose, entire, smooth above, sericeous with stellate scales underneath. *Racemes* terminal, male flowers superior.

A native of Sumatra. Flowering time in the Botanic garden March and April.

*Trunk* short, soon dividing into many spreading branches, with their divisions proliferous, from three to six-cleft. *Bark* of the old ligneous parts brownish and scabrous, that of the young shoots ferruginous with small, brown, peltate, stellate scales; the whole height of six-years-old plants about six feet. *Leaves* alternate, petioled, oblong ventricose, somewhat cordate at the base, entire, rather obtuse, smooth, green above; gray with numerous, small, sericeous scales underneath; from two to six inches long. *Glands*, two small flat, green ones at the base. *Petioles* from one to two inches long, round, brown with rust-coloured scales. *Stipules* setaceous. *Racemes* terminal, solitary, longer than the leaves, scaly; the *female flowers* occupying the lower fourth; and the male ones the upper three fourths. *Male calyx* five-parted. *Segments*

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short-ovate. *Petals* five, oblong, woolly. *Filaments* ten, rather longer than the petals. *Anthers* ovate. *Pistillum* none. *Female calyx* five-cleft. *Corol* none. *Nectary* none. *Germ* round, densely clothed with stellate scales, three-celled, with one seed in each, attached to the upper end of the axis. *Styles* three, soon dividing into two long, recurved divisions each. *Stigmas* simple.

5. C. *plicatum. Willd.* iv. 538.

Annual, straggling. *Leaves* roundish-cordate, repand, hairy. *Stamens* monadelphous. *Anthers* fifteen. *Capsules* scabrous.

C. asperum. *Kön. Mss.*

C. tinctorium. *Burm. Ind.* 304. *t.* 62. *f.* 1.

*Beng.* Khoodi-okra.

Annual, and appearing in very great abundance on dried up rice, and other cultivated fields about the latter end of the cool season; the whole plant has a hoary, reddish appearance, and every part is covered with numberless, small, stellate, white hairs, which gives it a hoary look. *Stem* and *branches* several, round, dichotomous, weak, straggling, from one to two feet long. *Leaves* alternate, petioled, broad-cordate, scolloped, waved, with two glands, one in each margin, close to the base, from one to two inches long, and nearly the same breadth. *Racemes* terminal, few-flowered. *Flowers* pale yellow. MALE FLOWERS, about the female. *Calyx* five-leaved. *Corol* five-petalled, linear-lanceolate. *Nectary* none. *Filaments* coalesced. *Anthers* fifteen. FEMALE FLOWERS erect. *Calyx* and *corol* as in the male. The nectary is wanting. *Styles* red. *Capsules* scabrous.

Cloth moistened with the juice of the green capsules, soon becomes blue, after exposure to the open air. They no doubt contain colouring matter, that might be usefully employed, probably similar to that of *Croton tinctorium.*



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6. C. *polyandrum. R.*

Shrubby. *Leaves* oval, often lobate, scollop-toothed, projecting glands at the base. *Male flowers* in axillary racemes; the *female* ones sub-solitary, no corol, anthers twin.

Jatropha *Montana. Willd.* iv. 563.

*Hind.* Hakoon.

*Teling.* Konda-amadum.

A perennial species, a native of the borders of rills of sweet water, and moist high places amongst the Circar mountains. It flowers during the wet and cold seasons.

*Stems* several from the same root, shrubby, straight. *Branches* few, young shoots a little downy, and round, from three to six feet high. *Leaves* alternate, petioled, oval, sometimes lobate, deeply toothed, or grossly and remotely serrate, a little hairy, three-nerved, with two projecting brown glands at the base, from two to six inches long. *Petioles* round, about an inch long. *Stipules* none, but two glands in their place. MALE FLOWERS racemed, small, of a dull yellow colour. *Racemes* axillary, erect, intercepted. *Calyx* five-leaved. *Corol* none. *Nectary* a membranaceous, yellow ring, surrounding the base of the filaments. *Filaments* shorter than the calyx, numerous, distinct, compressed, clubbed, with the apices bifid, each bearing two oval anthers. FEMALE FLOWERS peduncled, axillary, one, two, or three, bowing. *Calyx* cylindric, five-toothed. *Corol* none. *Nectary* as in the male. *Seeds* exactly like those of *Ricinus communis*, but much smaller.

The seeds are esteemed by the natives a good purgative; they administer one seed bruised up with water for every evacuation they wish the patient to have; each seed weighs about a grain and a half. They are said to be the real Jamalgata of the Hindoo Physicians. While others, and with more reason, think the flowering C. *Tiglium* to be the real drug.

7. C. *Tiglium. Willd.* iv. 453.

Arboreous. *Leaves* ovate, cordate, serrate, pointed, smooth.

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*Male flowers*, from fifteen to twenty woolly, unconnected stamens. *Female* without corol.

*Sans.* Jayapala.

*Hind.* Jamal gata.

Cadal avanacu. *Rheed. Mal.* ii. *t.* 33.

Granum Moluccum. *Rumph. Amb.* iv. *t.* 42.

It grows to be a small tree, from fifteen to twenty feet in height, in the Company's Botanic garden at Calcutta, and in flower most part of the year.

*Trunk* a little crooked, as thick as a man's thigh. *Bark* smooth, ash-coloured. *Wood* white and hard. *Branches* rather thin. *Leaves* alternate, petioled, ovate-cordate, slightly serrate, pretty smooth, from three to five inches long, and from two to three broad. *Racemes* terminal, erect. MALE FLOWERS above and numerous. FEMALE FLOWERS always single, rather longer, occupying the lower part of the raceme. *Male calyx* five-parted. *Petals* five, oblong, very woolly on the inside, and margin. *Filaments* from fifteen to twenty, distinct, woolly towards the base. *Female calyx* as the male. *Corol* none. *Nectary*, some small glands round the base of the germ.

The tree has a disagreeable smell, the taste of the leaves is exceedingly nauseous and of long duration. Tamul Physicians say the seed of this tree purges effectually and easily, removing all obstructions in the bowels; and that it cures all venereal complaints, and bites of venomous animals.

8. C. *Halecum. R.*

Arboreous. *Leaves* approximate, long-petioled, round, re-entering, cordate, entire, downy underneath, male panicles axillary. *Calyx* three-toothed. *Corol* none.

Halecus alba. *Rumph. Amb.* iii. *p.* 198.

A native of the Moluccas.

9. C. *drupaceum. R.*

Shrubby, often scandent, every part scabrous with stellate



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pubescence. *Leaves* cordate-serrate, two pedicelled glands under the base. *Racemes* terminal, with male flowers on one, and female ones on another. *Nut* three-partible, parts two-valved.

A native of the country about Dacca. Flowers in March, seed ripe in September.

*Trunk* short, and ill defined. *Branches* many, in a bad soil shorter; in a good soil and protected, long and scandent; *young parts* rough with an immense quantity of short harsh stellate pubescence. *Leaves* alternate, petioled, cordate, cuspidate, unequally and grossly serrate, three-nerved, harsh with stellate hairs, and having two yellow, pedicelled; subcyathiform glands immediately under the base, from four to six inches long, and three or four broad. *Petioles* round, about an inch long, harsh. *Stipules* ensiform, sometimes pinnatifid. *Racemes* terminal, simple, generally in pairs, becoming lateral by age, one bearing entirely male flowers, the other female, and sometimes a few male ones at the apex, every part pubescent. *Bractes* subulate, one-flowered. *Flowers* small, of a dull yellowish green colour. *Male calyx* deeply five-cleft, rather shorter than the corol. *Petals* lanceolate, with very woolly margins. *Nectary* five yellow glands, alternate with the petals. *Stamina* numerous, as long as the petals, inserted in a convex, woolly receptacle which occupies the whole centre of the flower. *Female calyx* as the male. *Corol* none. *Nectary* as in the male. *Germ* round, very hairy, three-celled, with one seed in each cell, attached to the top of the axis. *Styles* three, each divided near the base into two long, filiform, hairy, variously contorted segments. *Capsules* drupaceous, tricoccous, globose, scabrous, clothed with stellate pubescence, of the size of a large gooseberry. *Cortex*, when dry dividing from the apex into six portions; *nut* thick and very hard, spontaneously three-partible, each portion one-celled, two-valved. *Seed* or rather *nut* solitary, oval. *Integuments* two, the exterior one thick, of a bony hardness, rugose, of a chesnut colour, with a little stellate pubescence

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on the outside; the inner one a thin, white membrane. *Perisperm* conform to the nut, pale yellow. *Embryo* inverse. *Cotyledons* nearly as long as the perisperm, three-nerved in the fruit of the large variety; oblong-conic in the small variety, sub-rotund. *Radicle* oblong, superior.

10. C. *oblongifolium. Roxb.*

Arboreous. *Leaves* oblong, serrate, two glanded at the base, smooth. *Racemes* terminal. *Petals* woolly. *Stamens* twelve. *Capsules* round.

*Beng.* Buragach.

A small tree, common in forests about Calcutta. Flowering time the beginning of the hot season.

*Trunk* straight; *bark* ash-coloured, and pretty smooth. *Leaves* petioled, alternate, and thickly set about the ends of the branchlets, spreading or drooping, oblong, serrate, obtuse-pointed, very smooth on both sides, from six to twelve inches long. *Petioles* round and smooth, with a lateral gland on each side of their apices. *Stipules* small, caducous. *Racemes* terminal, generally solitary, erect, shorter than the leaves. *Flowers* solitary, a few female ones mixed with many male ones, small, of a pale yellowish green. *Bractes* three-fold, one-flowered. *Glands*, on the inside of each of the small, lateral bractes is a round permanent one, as in *Sesamum Indicum*. *Male calyx* deeply five-cleft. *Petals* six, smaller than the calyx, very woolly. *Filaments* twelve, distinct, nine in the circumference and three in the centre; woolly toward the base. *Female calyx* and *corol* as in the male. *Stamens* none. *Germ* globular. *Styles* three, each divided into two very long, variously bent segments. *Capsules* globular, fleshy, six-furrowed, tricoccous.

11. C. *Joufra.*

Arboreous, tender parts scaly. *Leaves* broad-ovate-lanceolate, serrate. *Racemes* sub-terminal, and lateral or axillary, much longer than the leaves. *Male flowers* above, and

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dodecandrous; *female* below, both with five lanceolate, woolly petals.

Joufra, the vernacular name in Silhet, where it grows to be a large tree. Flowering time March and April.

*Branchlets* proliferous; their tender shoots, clothed with minute silver-coloured scales, and no other kind of pubescence. In C. *bicolor*, which this most resembles, the scales are all ferruginous. *Leaves* crowded about the divisions of the tender shoots, alternate, petioled, broad-ovate-lanceolate, serrate, smooth, obtuse with an acumen, having two small flat glands on the base of the rib underneath, as in *bicolor*, but not having the shining silver-like appearance underneath which is in that species, from four to six inches long, and from one to two and a half broad. *Petioles* about an inch long, and scaly. *Stipules* small, subulate, scaly. *Racemes* lateral, axillary and sub-terminal, that is from the forks of the tender twigs, many times longer than the leaves; the lower part of the large sub-terminal ones is occupied by the female flowers, and some male ones mixed; all the rest by the male ones, both sorts have equally long pedicels. *Bractes* small. *Male calyx* deeply five-toothed, scaly on the outside. *Petals* five, lanceolar, woolly on the inside. *Filaments* twelve, longer than the petals. *Anther* ovate. *Female calyx* and *corol* as in the male. *Stamens* none. *Germ* oval, three-celled, one ovulum in each, attached to the upper end of the axis. *Styles* three, divided nearly to the base. *Stigma* simple.

### *JATROPHA. Schreb. gen. N.* 1463.

*Male calyx* five-parted. *Corol* from one to five-petalled. *Stamina* about ten. *Female calyx* and *corol* as in the male, *Styles* three, bifid. *Capsule* tricoccous.

1. J. *Curcas. Willd.* iv. 560. *Asiat. Res.* xi. 169.

Shrubby. *Leaves* broad-cordate, five-angled, smooth, Both male and female with a five-cleft calyx and five-petalled corol.

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*Beng.* Baghbarinda.

*Teling.* Napalam.

This is one of the most common small trees or bushes on the coast of Coromandel, and in flower and fruit all the year.

*Trunk* irregular, from being constantly kept low for hedges. *Wood* soft and spongy. *Bark* smooth, light ash-coloured. *Leaves* scattered, petioled, broad-cordate, five-angled, smooth, about six inches each way. *Petioles* round, smooth, from four to six inches long. *Stipules* none. *Panicles* terminal, or from the exterior axills, cymose, bearing many small, yellow flowers. The male flowers at the extremities of the ramifications, on short, articulated pedicels, and the female ones in their divisions, with their pedicels not articulated. *Bractes* a small one below each sub-division of the panicle, and generally one pressing on the calyx. *Male calyx* five-leaved. *Corol* five-petalled, campanulate, somewhat hairy. *Nectary* of five glandular bodies, round the base of the filaments. *Filaments* six, the central one very thick, columnar; the five exterior ones filiform, towards the base adhering to the central one, all erect, and a little longer than the calyx. *Anthers* ten, sagittate, equal; five supported by the large central filament, and one by each of the others. *Female calyx, corol* and *nectary* as in the male. *Germ* oblong, smooth. *Styles* three, short. *Stigma* bifid, somewhat hairy. *Pericarpium* and *seed* as in the genus.

The wood of this tree, or rather bush, is too soft and spongy to be of any use, it will not even burn freely.

The leaves warmed, and rubbed with castor oil are by the natives applied to inflammations where suppuration is wished for. An oil is expressed from the seed, which is only used to burn in lamps, by the poorer classes of the natives. The seeds taken inwardly act with great violence both upwards and downwards, and are therefore almost exploded from the Hindoo *Materia Medica.* They are seldom or never administered by our Medical Gentlemen.

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2. I. *glandulifera. Roxb.*

Calycled, sub-arboreous. *Leaves* palmate, base cordate, smooth, lobes from three to five, lanceolar, oblong, acutely serrate, each serrature ending in a headed bristle. *Petioles* naked. *Stipules* bristly, many-cleft. *Flowers* panicled, monadelphous, sub-octandrous.

This stout shrub is to be met with in a few gardens about Calcutta, where, in from six or seven years they have grown to be from four to eight feet high; from whence they came I cannot learn; but as the juice is used medicinally, I suspect the plant to be well known, if not indigenous at no great distance.

The trunk is short, soon dividing into dichotomous branches with smooth, swelled, ash-coloured bark. From fresh wounds there issues much thin, clear, pale yellowish juice.

*Leaves* about the extremities of the branchlets, alternate, petioled, generally palmate; *lobes* from three to five, oblong, the two posterior ones are much smaller than the other three, all are serrate, with each serrature ends in a short, green, glandular-headed bristle, from four to six inches each way. *Petioles* as long as the leaves, round, and smooth. *Stipules* bristly, many-cleft, each division ending in a glandular head. *Panicles* terminal, about as long as the leaves. *Bractes* bristly. MALE FLOWERS most numerous and terminal, small, of a pale greenish yellow colour. *Calyx* five-cleft to the base, sometimes ciliate. *Corol* ample, campanulate. *Petals* cuneate, conjoined toward the base, and there woolly on the inside.* *Nectary* five green glands round the base of the conjoined filaments. *Filaments* about eight, conjoined. *Anthers* twin. *Pistillum*, no rudiment of one, the staminiferous column occupying its place. FEMALE FLOWERS few, and sub-sessile in the divisions of the panicle. *Calyx* and *corol* as in the male. *Nectary*, five scales round the base of the

* Without strict examination, the corol may be taken for a petalled one.

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germ. *Styles* three, with enlarged, ragged stigmas. *Capsule* tricoccous, of the size of a filbert, and smooth. *Seeds* oblong, smooth, light green, crowned with a glandular body by which they are attached to the receptacle. *Embryo*, as in the other *Euphorbiæ*.

I am inclined to think this differs from Vahl's *Jatropha glauca*, though I cannot finally settle that point as I am not acquainted with that plant, except this be it; however the above description is so full, and I can safely say accurate, as to enable any one who may have an opportunity of comparing them, to determine. This is always a stout shrub, and never in any part pubescent; indeed from the whole of Vahl's description now before me, I am inclined to think them different species.

The pale or whey-coloured thin juice which exudes from a fresh wound of this plant, is employed by the Hindoos as an escharotic to remove films from the eyes.

*RICINUS. Schreb. gen. N.* 1464.

*Male calyx* four or five-leaved, or four or five-parted. *Corol* none. *Stamina* numerous. *Female calyx* three or five-parted. *Corol* none. *Styles* three, two-cleft. *Capsules* tricoccous.

1. R. *communis. Willd.* iv. 564.

*Leaves* peltate, sub-palmate, serrate. *Fruit* prickly.

*Sans.* Eranda.

*Teling.* Amadum.

*Hind.* Arend, Arendi, or Arindi.

*Beng.* Bherenda.

Of this very useful plant, we have several varieties cultivated in India, some of them growing to the size of a pretty large tree, and of many years duration; I have not seen any variety with smooth fruit.

On the leaves the domesticated Arrindy silk-worm (*Pha-*



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*læna Cynthia,)* are fed. See *Transactions of the Linnæan Society, vol.* vii. *p.* 42.

2. R. *mappa. Linn. sp. pl.* 1430.

Dioecous. *Leaves* peltate, cordate, entire, acute. *Spikes* panicled.

*Acalypha Mappa. Willd.* iv. 526.

Folium *Mappa. Rumph. Amb.* iii. *t.* 108.

One plant of this, a handsome small tree, with hitherto male blossoms, sprung up amongst some plants from Amboyna, introduced into the Botanic garden in 1798, where it flowers in July.

*Trunk* straight and perfectly erect. *Bark* and large branches, smooth and ash-coloured. *Branches* tending to be verticelled, ascending and spreading. *Branchlets* round, smooth, and glaucous. Height of the tree, now eleven years old, thirty-five feet. *Leaves* alternate, petioled, cordate, peltate, margins slightly waved, smooth on both sides, but very paler-coloured underneath, from numerous most minute, whitish dots. There are generally two, or three lanceolate smooth glands in as many of the smallest superior nerves; veins numerous, from six to twenty-four inches long, and nearly of the same breadth. *Petioles* nearly as long as the leaves, round, smooth, glaucous. *Stipules* cordate, reniform, acute, glaucous. *Panicles* of male flowers, axillary, erect, ramification alternate. *Bractes* alternate, sessile, cordate, concave, dentate, ciliate, many-flowered. *Flowers* numerous, very small, pale green. *Calyx* two-leaved, or deeply two-parted, reflexed. *Corol* none.

3. R. *dicoccus. Roxb.*

Arboreous. *Leaves* cordate, often lobate, repand-serrate. *Racemes* terminal, panicled. *Capsules* smooth, dicoccous.

Folium calcosum. *Rumph. Amb.* iv. *p.* 129. *t.* 64.

Some plants were received into the Botanic garden at Calcutta from Amboyna in 1798. Now, in 1808 they have grown

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to be small trees, about twenty feet high. Flowering time from April to June.

*Trunk* tolerably straight, about as thick as a man's thigh. *Bark* smooth, of a light ash-colour. *Branches* few, spreading; *young shoots* ascending, round and covered with minute grains. *Leaves* alternate, long-petioled, broad-cordate, and while the trees were young generally with three acute lobes, margins scollop-serrate, when they first unfold a little mealy, but by the time they are full-grown, smooth on both sides, with a cluster of small, dark coloured glands at the base of the upper side, about six inches each way. *Petioles* nearly as long as the leaves, round, smooth. *Stipules* very minute. *Racemes* terminal, nearly compound, indeed it may often be called a panicle. *Flowers* pedicelled, from one to three or even more together; *male* and *female* mixed, but the former by far the most numerous, small, of a greenish yellow colour. *Bractes* subulate, mealy. *Male calyx* four or five-cleft; divisions expanding, broad-lanceolate, mealy on the outside. *Corol* none. *Nectary*, none visible. *Filaments* very numerous, inserted into a hemispheric gland. *Anthers* linear, twin, with a common obovate gland at the top. *Female calyx* five-cleft. *Corol* none. *Nectary* a small flat receptacle, with a crenulate margin on which the germ rests. *Germ* two-lobed, clothed with stellate pubescence, two-celled, with one ovulum in each, attached to the top of the axis. *Style* two-cleft; *divisions* recurvate. *Stigmas* simple. *Capsule* dicoccous, each consisting of two valves, which open from the base. *Seeds* solitary, round, rugose, of a dark brown, about the size of a grain of pepper, affixed to the apex of a slender central receptacle.

### *SAPIUM. Schreb. gen. N.* 1469.

*Male calyx* from two to four-parted. *Corol* none. *Stamina* from two to four. *Female calyx* from three to four-parted. *Corol* none. *Germ* superior, from two to three-

celled; *cells* one-seeded; *attachment* superior. *Style* three-cleft. *Capsule* bi-tricoccous. *Embryo* inverse, and furnished with a perisperm.

1. S. *Indicum. Willd.* iv. 572.

Arboreous, branchlets often ending in a spine. *Leaves* alternate, broad-lanceolate, serrate, smooth. *Male flowers* amentaceous, triandrous. *Female* ones solitary. *Capsules* drupaceous.

*Beng.* Hoorooa.

Bengieiri. *Rheed. Mal.* iv. *t.* 61.

A small tree, a native of the Delta of the Ganges. It flowers at various seasons, and ripens its seed in from twelve to eighteen months afterwards. The branches are numerous, spreading in every direction, and covered with smooth, ash-coloured bark. The smaller short ones from the trunks, and longer branches often ending in a strong sharp thorn.

*Leaves* alternate, petioled, sub-pendulous, broad-lanceolate, serrate, smooth, of a deep shining green, from two to four inches long, and broad in proportion. *Stipules* small, caducous. MALE FLOWERS on terminal, cylindric aments. *Scales* of the ament glandular, from three to four-flowered. *Calyx* three-parted; *divisions* sub-cordate, expanding. *Corol* none. *Filaments* longer than the calyx. *Anthers* ovate. FEMALE FLOWERS at the base of the aments, often solitary. *Calyx* from three to four-parted. *Corol* none. *Germ* above, ovate. *Styles* three-cleft, divisions entire, and recurved. *Stigma* enlarged. *Capsule*, or *nut* globular, of the size of a nutmeg, three-celled, six-valved, thick and exceedingly hard. *Seed* solitary, affixed by the apex, oval, smooth.

The juice of this tree is reckoned of a very poisonous nature. The taste of the fruit is nauseous beyond description. The seeds are used by the natives for the nefarious purpose of intoxicating fish.

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2. S. *sebiferum. R.*

Arboreous. *Leaves* broad-rhomb-ovate, pointed, waved, entire, smooth, male flowers triandrous.

Croton *sebiferum. Linn. sp. pl.* 1425.

Stillingea *sebifera. Willd.* iv. 588.

*Beng.* Mom-China.

Is now very common about Calcutta, where, in the course of a few years it is become one of the most common trees. It is in flower and fruit most part of the year.

*Trunk* straight; *bark* ash-coloured, considerably cracked. *Branches* numerous, the larger ones nearly erect, the smaller ones spreading, with their extremities often beautifully pendulous. *Leaves* scattered, petioled, rhombic, pointed, margins waved, smooth on both sides, about two inches each way. *Petioles* nearly as long as the leaves, slender, channelled, smooth, with two glands on the upper side of the apex. *Stipules* caducous. *Racemes* terminal, cylindric. MALE FLOWERS fascicled, very numerous, small, yellow. *Calyx* irregularly three-toothed. *Corol* none. *Nectary* none. *Filaments* from two to three, very short, not connected. *Anthers* double. FEMALE FLOWERS large, three or four below the male. *Calyx* as in the male. *Corol* none. *Nectary* none. *Germ* oblong. *Styles* three, undivided. *Capsule* of the size of a cherry, tricoccous, smooth. *Seeds* enveloped in a white sebaceous substance.

In Bengal it is only considered as an ornamental tree; the sebaceous produce of its seeds is not in sufficient quantity, nor its qualities so valuable as to render it an object worthy of cultivation. Cocoa-nut oil is better for the lamp, and it is only during very cool weather that this substance becomes firm; at all other times it is in a thick, brownish, fluid state, and soon becomes rancid. Such is my opinion of the famous vegetable tallow of China.

3. S. *cordifolium. Roxb.*

Arboreous. *Leaves* cordate-serrate, cuspidate, three-nerv-

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ed; with glands in the axills of the nerves on the under side, and stipuled at the base. *Male flowers* octandrous, with a bifid calyx.

*Teling.* Badeki.

A small tree, a native of moist vallies among the Circar mountains.

*Trunk* straight. *Branches* and *branchlets* nearly erect. *Bark* pretty smooth. *Leaves* scattered, petioled, cordate, acuminate, serrate, three-nerved, below downy, with yellow glands between the origin of the nerves, above pretty smooth, from four to twelve inches long, and from three to eight broad. *Petioles* from two to four inches long, round, smooth, coloured. *Stipules* of the petioles subulate, caducous; those of the leaves subulate, recurved and permanent. *Female racemes* terminal, one or two. *Male racemes* several from the germs over the last year's naked branchlets below the leafy shoots, all erect and filiform, from two to six inches long.

*Note.* In some specimens I have found the male and female flowers on the same raceme, the male above and the female below. *Bractes* in both three-fold; the male ones many-flowered; the female ones one-flowered. *Male calyx* with the segments kidney-formed, spreading. *Corol* none. *Filaments* eight, short, tapering, spreading, united near the base into a flat, saucer-like body. *Anthers* oval. *Female calyx* below, six-parted; *segments* narrow, acute. *Corol* none. *Germ* ovate; *style* short. *Stigmas* three, long, thread-formed. *Capsules* three-celled, three-valved. *Seed* solitary.

4. S. *baccatum. R.*

*Leaves* ovate-oblong, acuminate, entire. *Berries* two-seeded.

Billa the vernacular name in Silhet, where it is indigenous, and grows to be a large and useful timber tree. Flowering time March and April; seed ripe in August.

*Branchlets* crowded, ascending and particularly smooth.

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*Leaves* petioled, alternate, broad-ovate lanceolate, acuminate, entire, glossy; from three to six inches long, by from one and a half to two and a half broad, having no glands at the base, but the margins are a little swelled where they join the petiole. *Petioles* from one to two inches long, smooth. *Stipules; male aments* terminal and axillary, slender and simple, the terminal ones sub-panicled, the axillary ones solitary, as long as the leaves. *Bractes* or *scales* of the ament cucullate, many-flowered, with an oblong gland on each side, as observed by Jussieu in his account of the habit of the genus *sapium*. *Flowers* very minute, pedicelled. *Calyx* four-toothed. *Corol* none. *Filaments* two, very short; *anthers* two-lobed, opening in the sides. *Racemes; female flowers* on a different tree, terminal and axillary, but fewer and shorter than the male. *Flowers* solitary, pedicelled. *Bractes* and *calyx* as in the male. *Corol* none. *Stamina* none. *Germ* superior, round, compressed, two-celled, with one ovulum in each attached to the top of the axis. *Style* none. *Stigmas* two, recurved. *Berries* globular, of the size of a small gooseberry, smooth, purple, two-celled. *Seed* solitary, of the size of a betel nut, unequally oblong, the inside being straighter. *Integuments* two, the exterior one fibrous; the inner one somewhat nuciform, brittle, dark brown. *Perisperm* conform to the seed, very oily. *Embryo* inverse. *Cotyledons* oval, nearly as broad and long as the perisperm, three-nerved. *Radicle* superior, large, oval.

*BRADLEIA. Schreb. gen. N.* 1474.

*Male calyx* six-leaved in a double series. *Corol* none. *Anthers* a few round the apex of a central column. *Female calyx* from six to twelve-leaved, in a double series. *Style* none or short. *Germ* superior, many-celled; *cells* from one to three-seeded; *attachment* internal. *Stigma* perforated at the top, with a many-lobed ray, corresponding with the cells in the germ. *Capsule* many-celled, many-valved. *Seeds*

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arilled, from one to three in each cell. *Embryo* erect and furnished with a perisperm.

1. B. *multilocularis. Roxb.*

Arboreous. *Leaves* broad-lanceolate, entire, smooth. *Flowers* axillary, both sorts peduncled. *Capsules* compressed, umbilicate, from ten to fifteen-celled.

Agyneja *multilocularis. Willd.* iv. 569.

A small ramous tree, a native of Bengal, and in blossom from April till October. Is nearly allied to Dr. Buchanan's *Agyneja coccinea.* See *Col. Symes' Embassy to Ava.*

*Trunk* tolerably erect, covered with pretty smooth, brownish gray bark. *Branches* numerous, down to the ground, spreading with bifarious, often drooping branchlets. *Young shoots* smooth. *Leaves* alternate, short-petioled, oblong, entire, smooth on both sides; from two to three inches long. *Stipules* subulate. *Peduncles* axillary, from one to three or more together, short, one-flowered. *Bractes* axillary, numerous, round the insertion of the male and female peduncles. *Male* and *female flowers* often in the same axill. *Male* smaller and deeper yellow. *Male calyx* six-parted to the base, three are exterior, and rather longer. *Filaments* in the centre, forming a single cylindric receptacle with from eight to twelve, linear grooved anthers adhering to it. *Female calyx* from six to twelve-leaved; the inner series, or alternate divisions rather smaller, all sub-cordate, entire, smooth, and permanent. *Stamina* none. *Germ* depressed, from ten to fifteen-lobed, united in a verticel, from ten to fifteen-celled, with two ovula in each, attached to the inner angle of the cell. *Style* none. *Stigma* fleshy, funnel-formed, with its round fleshy margins marked with as many ribs as there are cells in the germ. *Capsule* about an inch in diameter, depressed, with the apex and base concave, sides torulose, smooth, from ten to fifteen-celled, composed of two distinct tunics, opening round the base, and up the sides; the exterior one generally divides into as many segments, or

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valves, as there are cells, the inner one is of the colour and consistence of parchment, and divides into double the number of portions, these drop off together, leaving the seeds in pairs, in a circle round the large convex receptacle to which they are attached, and separated by very thin, white partitions, which were united to the inflected margins of the inner tunic of the capsule. *Seeds* two in each cell, obovate, flattened, sharp on the inner edge, enveloped in a soft, whitish, pulpy aril, which is covered with an orange-coloured pellicle. *Integuments, proper,* nuciform, rugose. *Umbilicus* an elevated point on the inner edge. *Perisperm* soft, of a pale azure colour. *Embryo* straight, nearly as long and broad as the perisperm. *Cotyledons* two, round-cordate. *Radicle* cylindric, pointing directly to the umbilicus, viz. inferior.

2. B. *lanceolaria. R.*

Arboreous, smooth. *Leaves* short-petioled, lanceolar, obtusely acuminate, glossy. *Flowers* axillary, the male ones numerous, and long-peduncled, the female ones few and sessile. *Anthers* from four to six, in a sessile head; *germ* about six-celled. *Style* lengthened.

Angóoti, the vernacular name in Silhet, where it is indigenous, and grows to be a large, useful timber tree; the wood being hard and durable is often employed by the natives in constructing their habitations. It ought to be compared with Cavanilles' *Bradleia Philippica.* See B. *Philippensis. Willd.* iv. 592.

*Tender shoots* glossy, in habit tending to erect and straight. *Leaves* alternate, short-petioled, from narrow-lanceolar to oblong, entire, firm and glossy, acuminate, from three to six inches long, by from one to two broad. *Stipules* triangular, permanent. MALE FLOWERS long-peduncled, and collected in a crowded fascicle in the lower axills, or from those of last year, also mixed amongst the few sessile female flowers in the exterior axills, colour of both sorts pale greenish yellow. *Calyx* in both ♂ and ♀ six-leaved; the exterior three



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longer, in the male oblong, in the female tapering from the base. *Filaments* very short. *Anthers* from four to six-lobed, linear. FEMALE FLOWERS sessile. *Germ* ovate, six-celled, with two ovula in each, attached to the thick axis. *Style* short and thick. *Stigma* six-lobed; *lobes* pointed and incurved. *Capsule* much depressed, turnip-shaped, with a concave apex and base, grooved, six-celled, twelve-valved. *Valves* composed of two distinct coats; the exterior one smooth, rather spongy and olive-coloured; the interior one like hard thin parchment, these open from the base, warp, and soon drop off, leaving the red seed attached to the clavate receptacle or axis. *Seeds* two in each cell, attached to the clavate axis, a full half of each on the side where two meet is filled with a soft yellow pulp when recent, which on drying disappears, and leaves a vacuum, coloured by the two exterior integuments almost exactly as in *Bradleia Sinica*, (*Gært. Sem.* ii. 127. *t.* 109.) which I might have supposed this to be, had I not now before me König's very excellent description and figure of that species in the first volume of his *Annals of Botany*, *p.* 356. *pl.* 7. *f.* 4. *Integuments* three; the exterior one red, polished and glossy; the second one like parchment; and the interior one thin and brown. *Perisperm* soft completely covering the embryo. *Embryo* inverse. *Cotyledons* obliquely ovate, cordate, thin. *Radicle* superior, with its apex at the umbilicus.

3. B. *impuber. R.*

Arboreous. *Leaves* sub-sessile, oblong, entire, smooth. *Flowers* axillary, pedicelled. *Style* none. *Stigma* perforated with a many-ribbed ray. *Capsule* turbinate.

A native of the Moluccas, agreeing well with the description of the *Agyneja impuber* in the *Mantissa*, except that the peduncles and the little roundish bractes round their insertions are smooth.

4. B. *pubera. R.*

All the tender parts more or less downy. *Leaves* short-

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petioled, oblong, entire, umbellets solitary, sessile above the axills. *Germ* round, and crowned with a large, roundish, six-lobed stigma. *Capsule* depressed, both sides umbilicate, six-celled.

Agyneja *pubera. Linn. Mant.* 296. *Willd.* iv. 569.

A native of the Moluccas. The male and female flowers are mixed in the same umbellets and supported on pedicells twice or thrice their length.

5. B. *hirsuta. R.*

Shrubby, all the tender parts very hairy. *Leaves* obliquely cordate-oblong, obtuse. *Peduncle* axillary, short, many-flowered. *Capsules* six-seeded.

A native of Prince of Wales' Island.

6. B. *nitida. R.*

Sub-arboreous. *Leaves* sessile, ovate-oblong, acute, shining, smooth. *Umbellets* above the axills. *Capsules* globular, five-celled.

*Teling.* Yeati-palla.

A small tree or large shrub, a native of the moist vallies amongst the Circar mountains. It flowers during the cold season.

*Trunk* erect with a large shady head. *Bark* scabrous, dark-coloured, astringent. *Branches* sub-erect. *Branchlets* bifarious, smooth. *Leaves* short-petioled, bifarious, ovate, oblong, acute, entire, smooth, of a shining deep green; from four to eight inches long. *Stipules* small, acute. *Umbellets* very short-peduncled, far above the axills, bearing many male and female flowers mixed, but always a very large proportion of female ones. MALE FLOWERS pedicelled. *Calyx; leaflets* six, three of them standing within the other three, and alternate with them. *Corol* none. *Anthers* linear, from five to six pair, affixed to the middle of the short, gibbous, five or six-toothed column. FEMALE FLOWERS more numerous, pedicelled. *Calyx* as in the male. *Style* none,



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or most short; apex perforated, with the margins of the perforation from five to six-cleft. *Capsules* sub-globular, small, apex a little compressed, from five to six-celled, from ten to twelve-striated, and from ten to twelve-valved. *Seeds* two in each cell.

7. B. *Sinica. Willd.* iv. 591.

Shrubby, erect, tender parts hairy. *Leaves* bifarious, oblong, acute, entire, hairy underneath. *Flowers* axillary, fascicled. *Style* rather long; *stigma* trifid with the lobes bidentate. *Capsule* six-celled.

Arbuscula Sinica, &c. *Pluk. Alma. p.* 35. *pl.* 7. *t.* 368. *f.* 1.

Found by Mr. Roxbourgh, in the forests of Pulo Pinang under the shade of large trees; in flower and with ripe seed in July.

8. B. *pinnata. Roxb.*

Arboreous. *Leaves* scattered, pinnate; *leaflets* alternate, numerous, oblong. *Capsule* from eight to twelve-celled; *cells* one-seeded.

Reared in the Botanic garden at Calcutta, from seed sent from Pulo Pinang by Mr. C. Smith. In twelve years it has grown to be a tree of considerable magnitude, and is in blossom most part of the year.

*Trunk* straight. *Bark* smooth, ash-coloured. *Branches* numerous in every direction, forming a large, dense, roundish head; height of the tree forty feet. *Leaves* scattered round the ends of the branches, pinnate, lengthening, as in many of the *Phyllanthi*, to two or more feet. *Leaflets* very numerous, alternate, petiolate, obliquely oblong, entire, somewhat villous underneath; from one to two inches long, and less than one broad. *Petioles* and *petiolets* round and downy. *Stipules* of the leaflets small, cordate, pointed. *Flowers* axillary, drooping, generally several male and one female together, the former small and yellow, upon longer

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slender peduncles, the latter short-pedicelled. *Male calyx* six-leaved. *Nectary* none. *Filaments* single, swelled above the middle, to which part five anthers are fixed by their backs. *Female calyx* nearly as in the male. *Nectary* none. *Germ* villous, ovate. *Style* scarcely any. *Stigma* large, with the margin from eight to twelve-cleft. *Pericarp* fleshy, of the size of a cherry, dividing spontaneously into as many parts as there were segments in the stigma. *Seeds* generally one to each division of the pericarp.

It has the habit of a *Phyllanthus*, but the natural character is that of *Bradleia*.

## MONOECIA SYNGENESIA.

### *TRICHOSANTHES. Schreb. gen. N.* 1476.

*Male calyx* five-toothed. *Corol* five-parted, fringed. *Filaments* three. *Female calyx* and *corol* as in the male. *Style* three-cleft. *Pepo* oblong.

1. T. *anguina. Willd.* iv. 598.

Annual, scandent. *Leaves* more or less five-lobed. *Male flowers* racemed; *female* solitary. *Pomes* spindle-shaped.

*Beng.* Chichinga.

Anguina *Sinensis. Mil. t.* 32. is but a very bad representation of our Indian plant.

Much cultivated in the warmer parts of Asia, for its fruit, which is universally eaten by the natives in their stews and curries. I have never met with the plant in its wild state. A variety was raised from seed sent from Nepal by Dr. Buchanan, the leaves of which are more deeply divided, and the fruit longer than those of the southern parts of India, but in other respects they are the same.

2. T. *dioeca. R.*

Dioecous, herbaceous. *Pomes* oblong, smooth. *Seeds* glo-

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bular. *Leaves* cordate, dentate, scabrous; both male and female flowers solitary.

*Sans.* Putulika.

*Beng.* Putal.

*Hind.* Pulwul.

This is by far the most useful species of *Trichosanthes* I am yet acquainted with. It is much cultivated by the natives about Calcutta, during the rains. It is unknown on the coast of Coromandel.

*Root* perennial. *Stems* creeping and running to a great extent, five-sided, scabrous. *Leaves* alternate, petioled, cordate, dentate, scabrous, when young soft. *Petioles* woolly, variously bent, channelled. *Tendrils* simple, or two-cleft. MALE FLOWERS on a separate plant, axillary, solitary, on pretty long peduncles. *Tube* of the corol very long, trumpet-like; *stamens* three, distinct. FEMALE FLOWERS axillary, solitary, short-peduncled. *Corol* large, with the fringe ample. *Pomes* oblong, both ends obtuse, when ripe smooth, and of a deep orange colour, about four inches long, and the same in circumference. *Seeds* globular, with a somewhat callous border. The unripe fruit and tender tops are much eaten both by Europeans and natives in their curries, and are reckoned exceedingly wholesome.

3. T. *cucumerina*. *Willd.* iv. 600.

*Pomes* ovate, acute. *Leaves* broad-cordate, from three to five-lobed, margins toothletted. *Male flowers* racemed; *female* ones solitary.

Pada valam. *Rheed. Mal.* viii. *t.* 15.

*Teling.* Aduvee-putla.

A pretty extensive, climbing annual, a native of hedges, &c. where it has shelter. It flowers during the cold season.

*Stem* five-sided, slightly downy. *Tendril* three-cleft. *Leaves* broad-cordate, angular and sometimes lobed, toothed, downy, very various in size. MALE FLOWERS racemed, small, white, beautifully fringed. *Racemes* axillary, erect,

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longer than the leaves, many-flowered. FEMALE FLOWERS axillary, solitary, short-peduncled like the male ones. *Fruit* oval, or oblong, pointed, cells imperfect, from one to four inches long, and from an inch to an inch and a half in diameter, till ripe striated with white and green, when ripe red. *Seeds* involved in a red pulp, lobate.

The unripe fruit is eaten in stews, by the natives, it is exceedingly bitter, for which it is reckoned the more wholesome, and is said to be *anthelmintic.*

4. T. *lobata. Roxb.*

*Pomes* linear oblong, smooth. *Leaves* downy, from five to seven-lobed; *lobes* scollop-toothed. *Male flowers* racemed. *Female* solitary.

*Beng.* Bun-chichinga.

This plant grows in hedges, and among bushes. It flowers during the wet season.

*Stems* five-sided, somewhat hairy, running to a great extent. *Leaves* petioled, from five to seven-lobed; *lobes* obovate, scollop-toothed, of a soft downy texture; from six to seven inches each way. *Tendrils* three-forked. *Female flowers* racemed, white. The female ones solitary, and white also. *Pomes* linear oblong, smooth, ornamented lengthways except near the base, with ten white streaks. *Seeds* each surrounded with its own proper gelatinous, bright red nidus.

This is never eaten, although it appears to be a useful species.

5. T. *cordata. R.*

*Root* perennial, tuberous. *Pomes* globose, smooth, of the size of an orange. *Leaves* cordate, and cordate-lobate. *Male flowers* racemed; the *female* ones solitary.

Boomee-Koomura of the Hindoos near the mouth of the river Megna, where the plant grows wild, and its root is used by the natives, as a substitute for Colomba root. It has by mistake I presume, been sent to London as the real Colomba of Mozambique.

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*Root* tuberous, perennial, growing to the size of a man's head. *Stems* herbaceous, climbing to the length of some fathoms, five-sided, villous, or even somewhat scabrous when old. *Tendrils* opposite, three-cleft. *Leaves* alternate, petioled, cordate and cordate-lobate, finely dentate, villous on both sides, about six inches each way. *Petioles* channelled, a little hairy, scarcely half the length of the leaves. *Male raceme* axillary, solitary, as long as the leaves. *Bractes* alternate, sessile, cuneate, oblong, acute, serrulate, one-flowered. *Flowers* large, white, the fringe of the segments coarser than in the other species known to me. FEMALE FLOWERS axillary, solitary, short-peduncled. *Pome* spherical, of the size of an orange, and of nearly the same colour, only redder, and as in T. *palmata*, which it is much like, the cells and partitions are very obscure. *Seeds* numerous, immersed in soft, gelatinous, green pulp.

6. T. *palmata. Roxb.*

Perennial. *Fruit* globular, smooth. *Leaves* palmate; *lobes* acute, sub-lanceolate. *Male flowers* racemed; *female* ones solitary.

*Beng.* Mukhal.

*Teling.* Kaki-danda.

A large, climbing perennial; a native of forests, where it runs over the highest trees. It flowers during the hot and rainy seasons.

*Stem* angular, covered with gray, scabrous, somewhat corky bark, the young green parts smooth. *Tendrils* three-cleft. *Leaves* scattered, petioled, generally palmate, though sometimes only from three to five-lobed; *divisions* acute, slightly serrate, from three to five-nerved, smooth, having frequently several round, glandulous, hollow spots on the under side. *Petioles* channelled. *Stipules* single, small, axillary. MALE FLOWERS racemed, large, white, most beautifully fringed with long, white, ramous filaments. *Racemes* axillary, longer than the leaves. *Bractes* solitary, one-flow-

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ered, oval, fringed, covered on the outside with dark green glandulous spots. *Calyx* bracte-like. FEMALE FLOWERS generally axillary, peduncled, though sometimes racemed also. *Fruit* globular, smooth, of the size of a small orange, when ripe of a bright deep red, replete with a dirty looking, dark greenish, soft pulp, in which the seeds nestle.

The fruit is reckoned poisonous, and I am told it is mixed with rice and employed to destroy crows.

7. T. *heteroclita. R.*

Perennial, scandent. *Leaves* from three to five-lobed; *male flowers* racemed; *female* ones solitary, or racemed. *Pepo* sub-globular, containing as many as six large, two-lobed, nuciform seeds.

*Goolur* of the natives of the Silhet district.

A native of the eastern parts of Bengal. From Silhet Mr. Robert Keith Dick, the Judge of that district, sent plants to the Botanic garden in 1805, where they blossom during the greater part of the year, and the seed ripens in October. Now, 1811, the original plants sent by Mr. Dick are of many fathoms extent, running to the top of high trees, yet continuing to increase rapidly, and do not by any means appear to have attained their full size.

*Root* ramous, as in most other plants. *Stems* one or several from the same root, perennial, climbing to a great extent, up and over large trees. *Bark* of the old ligneous parts olive-coloured, and somewhat cracked; that of the young shoots smooth, and a little furrowed. *Leaves* alternate, petioled, from three to five-lobed, from three to five-nerved, smooth on both sides, having the lobes entire, oblong, or triangularly ovate, acuminate, from six to twelve inches each way. *Petioles* shorter than the leaves, nearly round, reddish, and smooth. *Stipules* solitary, sub-axillary, thick, short, conical, coloured. MALE FLOWERS. *Racemes* axillary, solitary, about the length of the leaves, smooth, of a deep brown, bearing several alternate, sub-sessile, very large flowers near



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the apex. *Bractes* solitary, oblong, acute, thick, and firm. *Calyx* one-leaved, funnel-shaped clothed on the outside with much ferruginous, mealy pubescence; *mouth* five-toothed, with one, two, or three smooth, elevated, chesnut coloured, small glands on the outside of each tooth. *Corol* five-parted, inserted on the mouth of the calyx; *segments* sub-obcordate, retuse, with an acute point in the centre, having half of the outside, which was exposed to the weather before expansion, coloured brown, the rest pale yellowish white; the exterior margins wonderfully perforated and fringed with most beautiful, very long, spiral, pendulous, villous, yellow threads. *Filaments* three, from the mouth of the tube of the calyx under the corol, clavate. *Anthers* united, forming a broad inverted cone; variously grooved with the polliniferous, worm-like cells. *Pistillum* not any appearance of this organ. FEMALE FLOWERS sometimes on a distinct plant. *Peduncles* axillary, cylindric, dark brown, rather more than one inch long, one-flowered. Sometimes, though rarely, they are also on a raceme, which is very short compared with that of the male flowers. *Calyx* and *corol* as in the male. *Stamina* none. *Germ* inferior, broad-cordate, deep brown, studded with elevated, paler coloured specks, one-celled, containing six pairs of ovula attached to the base of the three receptacles, and separated by much spongy, juicy pulp. *Style* the length of the tube of the calyx and adhering to it, except at the base and apex. *Stigma* large, three-lobed; *lobes* emarginate. *Berry* oblately spheroidal, somewhat villous, apex somewhat pointed, of the size of a shaddock, being about five or six inches in diameter, when dry, brittle, one-celled. *Seeds* six, when all come to maturity, which is common, sub-reniform, unequally two-lobed; the fertile lobe about three inches long, by nearly two broad, and about one in thickness, convex or circular on the exterior edge, straight on the inner one, with the apex rounded, and the base less so; the abortive lobe is much smaller, but of the same form. *Integuments* three, the exterior one a perfect, very hard, lig-

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neous, porous, villous nut; in its base is a slit, or opening through which the base of the next integument passes; the middle one thick and spongy particularly before perfect maturity, in that state it may be taken for a perisperm; the exterior one membranaceous, and slightly reticulate. *Perisperm* no other than the middle gray spongy envelope of the seed. *Embryo* erect. *Cotyledons* conform to the cell of the exterior integument, thick, firm, white. *Plumula* of two unequal lobate lobes. *Radicle* conic; inferior.

*MOMORDICA. Schreb. gen. N.* 1477.

*Male calyx* five-toothed. *Corol* five-parted, or five-petalled. *Female calyx* and *corol* as in the male. *Style* trifid. *Pepo* fleshy, bursting when ripe with or without elastic force. *Seeds* enveloped in a soft aril.

1. M. *Charantia. Willd.* iv. 602.

*Leaves* palmate, having nerves. *Peduncles* solitary, with a round, reniform bracte at or below the middle. *Fruit* lengthened, tubercled, tapering at both ends. *Seeds* with a thick notched margin.

Pandi-pavel. *Rheed. Mal.* viii. *t.* 9.

Amara-indica. *Rumph. Amb.* v. *t.* 151.

*Beng.* Korilla.

*Teling.* Korella.

Cultivated in all the warmer parts of Asia for the fruit, which the natives eat, while unripe, in their curries. The fruits are bitter and reckoned wholesome.

2. M. *muricata. Willd.* iv. 602.

*Leaves* palmate. *Peduncles* solitary, with a reniform bracte near the base. *Fruit* gibbous, muricated, with tubercles between, tapering at both ends. *Seed* with a thick notched margin.

Pavel. *Rheed. Mal.* viii. *t.* 10.



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*Sans.* Soosavi.

*Beng.* Oochya, or Oochi.

*Hind.* Bura-korilla.

Cultivated by the natives of India, even more extensively than *Charantia.* The fruit, though much smaller, being more esteemed. It is found in abundance in every market.

3. M. *monadelpha. Roxb.*

Dioecous. *Leaves* angle-cordate, smooth. *Corols* campanulate. *Filaments* single. *Fruit* smooth.

Bryonia foliis cordatis. *Flor. Zeyl. N.* 356.

B. foliis sub-rotundis. *Burm. Zeyl.* i. 19. *f.* 1, 2.

Vitis alba indica. *Rumph. Amb.* v. *t.* 166. *f.* 1.

*Sungs.* Vimba.

*Beng.* Tela-koocha.

Bryonia *grandis. Willd.* iv. 617.

*Teling.* Kaydonda.

A native of every hedge in the country, and seems to thrive equally well in every soil. It is always dioecous.

*Root* ramous, not tuberous. *Stems* climbing, running over trees, and bushes, five-sided, perennial, scabrous. *Tendrils* lateral, simple. *Leaves* alternate, petioled, cordate, five-angled, with a few minute teeth round the margin, smooth, having one, two, or three hollow glands, under the base, from two to three inches each way. *Petioles* round, smooth, about half an inch long. *Peduncles,* in both the male and female plants, axillary, single, undivided, one-flowered. *Flowers* large, white, downy on the inside. *Male calyx,* and *corol* as in the genus. *Filament* single, columnar, short. *Anthers* creeping up and down, sometimes three of the convolutions are elevated considerably above the rest. *Female flowers* on a separate plant. *Calyx* and *corol* as in the male. *Stamens,* there are only the rudiments of three filaments. *Style* single, short. *Stigma* three-cleft; *segments* double. *Berry* smooth, two inches long, and one in diameter, before ripe marked with ten streaks of white; when ripe red, three-celled, bursting irregularly. *Seeds* numerous as in *Cucumis.*

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The ripe fruit is eaten raw by the natives, and while green in their curries. Crows and other birds are fond of them.

4. M. *dioeca. Willd.* iv. 605.

Dioecous, root perennial, tuberous. *Leaves* from three to five-lobed, scabrous. *Petioles* without glands. *Male* and *female flowers* solitary, the former cowl-bracted. *Fruit* ovate, muricate, bursting. *Seeds* a few.

Bem paval. *Rheed. Mal.* viii. *t.* 18.

Pooagakara is the Telinga name of the male plants, and Agakara of the female.

They are natives of thickets, and banks of rivers, where there are bushes for them to run on. Flowering time the wet and cold seasons.

*Root* tuberous, large, perennial, with somewhat of an astringent taste. *Stems* annual, five-sided, slender, smooth, about as thick as a log line, running to the extent of one or two fathoms. *Tendrils* simple. *Leaves* scattered, petioled, from three to five-lobed, irregularly toothed; above a little scabrous, below pretty smooth. MALE FLOWERS on a different plant, axillary, solitary, large, yellow, long-peduncled. *Peduncles* with a large, gibbous, striated, blown up spathe-like bracte at the apex, which encloses the bottom of the flowers. *Corol, petals* lanceolate. FEMALE FLOWERS axillary, solitary, peduncled, large, of a pale yellow. *Peduncles* about as long as the petals, near the base there is a small sheathing bracte. *Fruit* about the size and shape of a partridge's egg, murexed. *Seeds* many, oval, gray; each surrounded with a large, pulpy, crimson aril.

The natives eat the tender, green fruit in their curries; also the tuberous roots of the female plant; they are larger than those of the male, generally weighing from two to three pounds.

5. M. *mixta. Roxb.*

Dioecous, root tuberous, perennial. *Leaves* sub-palmate,

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smooth; *petioles* with glands. *Male* and *female flowers* solitary and corol-bracted, with glands on the lower margins of the bractes. *Fruit* oval, sharply murexed.

*Sans.* Kurkuta.

*Hind.* Kakrool.

*Beng.* Gol-kakra.

Muricia Cochin Chinensis. *Lourier. Cochin Ch.* 733.

This plant is a native of thickets about Calcutta. Flowering time the wet season. Like M. *dioeca* it has male flowers on one plant, and female ones on another.

*Root* tuberous, perennial. *Stems* annual, climbing, somewhat five-sided, smooth. *Tendrils* simple. *Leaves* petioled, from three to five-lobed, or palmate, sometimes serrate, smooth on both sides, from four to six inches each way, with the lobes oblong. *Petioles* channelled, with an uncertain number of umbilicate, green glands scattered over them. MALE FLOWERS axillary, solitary, on long peduncles, or racemed, large, of a dirty whitish cream colour. FEMALE FLOWERS axillary, solitary. *Bractes* solitary, large, two-lobed, cowled, embracing the calyx as in *Momordica dioeca*. *Lobes* striated, a little scabrous, having lower margins fringed with many green glands. *Male calyx* of a dark blackish purple, striated, and scabrous. *Corol* five-petalled, campanulate, with the side downy, and the bottom marked with three-coloured spots. *Filaments* and *anthers* marked with the same dark purple colour, which prevails on the calyx. *Female calyx* and *corol* as in the male. *Pistillum* as in the genus.

6. M. *umbellata. Roxb.*

Dioecous, root perennial. *Leaves* from cordate-sagittate to three or five-lobed, bristle-toothed; *male flowers* sub-umbelled; the *female* ones solitary. *Fruit* oblong, many-seeded; *seeds* round.

*Beng.* Kooduri.

*Hind.* Amoot-mool or Turuli.

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Bryonia *umbellata. Willd.* iv. 618.

*Teling.* Teed danda.

This plant is a native of hedges and forests. Flowering time the wet season.

*Root* perennial, consisting of many pendulous tubers. *Stems* climbing to a great extent, five-sided, smooth. *Tendrils* simple. *Leaves* petioled, halberted, angle-cordate or three-lobed; *lateral lobes* often two-parted, all minutely bristle-toothed, pretty smooth, from three to four inches each way. *Stipules* solitary, clubbed. MALE FLOWERS umbelled, always on a distinct plant. *Umbels* axillary, simple, shorter than the leaves; *pedicels* bracted above the middle. *Corol* gibbous, smooth, five-toothed. *Receptacle* as in *Cucumis.* FEMALE FLOWERS axillary, single, peduncled. *Corol* as in the male. *Fruit* oval, the size of a pigeon's egg, smooth, red. *Seeds* from sixteen to twenty, sub-globular.

The ripe and unripe fruit are eaten by the natives, as are also the roots when boiled.

7. M. *tubiflora. Roxb.*

*Leaves* roundish, angles obscure. *Female flowers* solitary; the *male* ones solitary, longer peduncled or racemed, with gashed bractes. *Tube* of the male corol long and gibbous. *Fruit* oblong, with ten hairy ribs.

A native of the forests about Dacca. From thence the late Colonel Peter Murray sent the seeds to the Botanic garden, where the plants blossom during the rains, and ripen their seed in two, or three months afterwards.

*Root* perennial. *Stems* creeping to an extent of many feet, slender, five-sided, somewhat rough with short hair. *Leaves* roundish, three or five-lobed, or angular, margins acutely toothletted, scabrous with harsh hairs on both sides. *Flowers* axillary, very large, pure white. The male ones solitary, and on a long peduncle while the plants are young, but when advanced, on long peduncled, axillary spikes with large, gashed, one-flowered bractes. The female ones solitary, short-

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peduncled, smaller. *Corol* that of the male with a long gibbous tube, that of the female shorter, and sub-cylindric. *Border* of five, large, spreading, obovate divisions. *Stamens* within the tube. *Style* the length of the tube. *Stigma* three-cleft. *Fruit* one-celled, oblong, ten-ribbed, rough with short stiff hairs, particularly the ribs, about two inches long, by three quarters of an inch in diameter, when ripe, orange coloured, bursting slowly, exposing the smooth thick margined seeds disposed in three rows and enveloped in a soft dark greenish aril.

### *LUFFA. Tournf.*

*Male calyx* five-toothed. *Corol* five-petalled. *Filaments* generally three. *Female calyx* and *corol* as in the male. *Pepo* inferior, becoming dry and inwardly fibrous, opening by the falling or decay of a lid at the apex.

1. L. *pentandra. Roxb.*

*Leaves* angular lobate, or palmate. *Stamens* five. *Fruit* linear, marked with ten straight lines like ridges. *Seed* with elevated dots and sharp waved margins.

Petola. *Rumph. Amb.* v. *t.* 147.

Momordica *Luffa. Willd.* iv. 603.

Cattu picinna. *Rheed. Mal.* viii. *t.* 8.

*Beng.* Doondool.

Purula Kindi and Tita purula, a wild variety.

*Teling.* Nuni-beerd.

I have only found this plant in its cultivated state. It is considerably larger then *acutangula* in all its parts, and is cultivated at the same season.

*Tendrils* from four to six-cleft. *Leaves* alternate, petioled, the lower ones five-angled with the angles acute, the superior ones palmate; *segments* conic, lanced, very acute; all slightly serrate, pretty smooth, from six to twelve inches each way. *Petioles* striated, a little channelled. *Stipules* solitary,

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axillary, cordate, glandular as in L. *acutangula.* MALE FLOWERS racemed, as in L. *acutangula*, but in this species the lowermost flower of the raceme is often female. *Bractes* as in L. *acutangula*. *Filaments* five, distinct. *Anthers* subequal, contorted, worm-like. FEMALE FLOWERS solitary, peduncled, axillary or the lowermost on the raceme. *Calyx* five-leaved, glandular. *Nectary* five-lobed, glands with woolly insertions. *Stigma* four-lobed. *Fruit* linear, smooth, striated, with ten deeper coloured streaks, but no elevations, from one to three feet long, and about three inches in diameter; internal structure as in the former. *Seeds* gray, with elevated dots; margin sharp, waved.

The unripe fruit is eaten by the natives in their curries, like that of the former species, but is not so much esteemed. The seeds are generally sown by the root of a tree, on the huts of the natives, over which the plants run.

2. L. *acutangula. Roxb.*

*Stems* slender and smooth. *Leaves* five-angled, dentate, pretty smooth. *Fruit* short, clubbed, with ten sharp ridges. *Seeds* pitted.

Cucumis *acutangulus. Willd.* iv. 612.

Picinna. *Rheed. Mal.* viii. *t.* 7.

*Hind.* Turai.

*Beng.* Jhinga.

Luffa *foetida. Willd.* viii. 380.

Ghorla-beera, or beerkay of the Telingas, for it is known equally well by either name in that country. It is very generally cultivated by the natives during the wet and cold seasons. I have never found it wild.

*Stems* several, slender, running to a great extent but with fewer branches than any other species that I know, pretty smooth, five-sided. *Tendrils* three-cleft. *Leaves* as in *Cucumis sativus*, but less rough. *Stipules* axillary, solitary, cordate, with glandular marks on one side. MALE FLOWERS pretty large, yellow, on long, erect, axillary racemes, the pe-



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dicels have a glandular bracte near the base, and are articulated a little above it. FEMALE FLOWERS rather larger, axillary, solitary, peduncled. *Fruit* clavate, obtuse, pretty smooth, ten-angled; *angles* sharp but smooth, about a foot long, and from two to three inches in diameter; when ripe dry and replete with dry fibres. *Seeds* black, irregularly pitted.

The half grown fruit is one of the best native vegetables we have in India; the natives use it much in their curries; when peeled, for the skin is hard, boiled, and dressed with butter, pepper, and salt, they are little inferior to green pease.

*Note.* There is the rudiment of a lid at the apex of the fruit of the species, but it never separates spontaneously; this circumstance is to be attended to, to distinguish it from *Cucumis operculatus.*

3. L. *clavata. R.*

*Leaves* superficially from five to seven-angled, the posterior lobes rounded, margins minutely-dentate. *Male flowers* on long peduncled racemes; the *female* ones solitary; *fruit* clavate, very long and slender.

A native of the interior parts of Hindoosthan. The seeds were sent by Colonel Alexander Kyd at Allahabad to the Botanic garden at Calcutta, where the plants blossom and produce fruit during the cold season.

*Stem* scandent, several fathoms long, five-sided, smooth. *Leaves* slightly from five to seven-lobed; posterior lobes rounded, the rest more acute, margin slightly dentate, pretty smooth on both sides, about six inches each way, when full grown. *Flowers* very long, of a deep yellow. The male ones on axillary, long-peduncled racemes. The female ones axillary, solitary, supported on peduncles about the length of the germ. *Bractes* of the male flowers solitary, one-flowered, oval, small, fleshy, glandular, inserted on the pedicel. *Fruit* pendulous, of a long, slender, clavate shape, three-celled, when ripe dry, and the partitions composed of dry fibres. *Seeds* numerous, thin, sharp-edged, lodged in the thickened

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part of the fruit near the apex. The young unripe fruit is eaten by the natives in their curries, and other stews.

4. L. *amara. R.*

*Stems* slender. *Leaves* slightly from five to seven-lobed. *Male flowers* racemed; the *female* ones solitary. *Fruit* oblong, with ten sharp ridges.

*Beng.* Kerula.

*Teling.* Sheti beera.

This species grows wild in hedges and dry uncultivated places. It flowers during the latter part of the rains and the cold season.

It is *Cucumis indicus striatus opercula donata*, of Plukenet, *t.* 172. *f.* 1. which is a very good figure of it.

*Stems*, *leaves*, *inflorescence*, and *flowers* as in *Luffa acutangula. Fruit* oblong, three or four inches long, and one in diameter, tapering equally towards each end, ten-angled, as in L. *acutangula*, when ripe, dry, of a gray colour, and replete with the same dry fibres; the lid or stopple which till then shuts up the apex drops off and the seeds fall out. *Seeds* of a blackish gray colour, marked with elevated minute black dots.

Every part of this plant is remarkably bitter, the fruit is violently cathartic and emetic. The juice of the roasted young fruit is applied to the temples by the natives to cure headach. The ripe seeds either in infusion or substance are used by them to vomit and to purge.

5. L. *racemosa. R.*

Annual. *Leaves* round cordate, five-sided. *Racemes* axillary, minute, ineffective, male flowers below, and many fertile hermaphrodite ones over the rest. *Fruit* short, cylindric, obtuse, smooth, and marked with five flat longitudinal ribs.

Cultivated in the interior parts of Bengal, for its esculent



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fruit, which like those of *pentandra*, *acutangula* and *clavata*, are eaten in their immature state.

6. L. *graveolens. Roxb.*

*Leaves* reniform, and scollop-toothed. *Fruit* oblong, beset with soft innocent prickles, while short papillæ, and short hairs closely clothe the interstices.

A native of the Rajmahl hills, from thence the seeds were brought to the Botanic garden, where the plants blossom during the rainy season, and the seed ripens about three months afterwards.

*Stems* running, as in the common cucumber, and nearly as long as they, more slender, and somewhat villous. *Tendrils* from three to four-cleft. *Leaves* reniform, somewhat lobed, and always scollop-toothed, surface armed with a few minute denticuli. *Flowers* axillary, male and female mixed, and blossoming in succession, though it rarely happens that more than one of the female flowers are productive. The male blossoms are larger and sub-sessile, the female short-peduncled, with one or two glandular, sub-rotund bractes on each. *Fruit* oblong, about the size of a man's thumb, armed with numerous, conical, soft, innocent points, and between them covered with short hairs and little papillæ; when ripe dark, of a brownish black, containing many black, oval, compressed seeds, mixed with dry white fibres, as in L. *acutangula*, &c.

The whole plant has a most disagreeable, heavy smell.

7. L. *echinata. Roxb.*

Dioecous, scandent. *Leaves* about five-lobed, scollop-toothed. *Male flowers* racemed. *Female* ones solitary. *Fruit* oval, echinate, with straight, long bristles.

A native of the coast of Coromandel. It flowers about the close of the rains. The seed ripens during the cold season.

*Stems* herbaceous, scandent, five-sided, most slightly hairy, one or two fathoms long. *Tendrils* two-cleft. *Leaves* ge-

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nerally five-lobed, somewhat hairy, particularly the nerves, and veins on the under side; margins scollop-toothed. *Petioles* as long as the leaves, ribbed. *Stipules* axillary, solitary, oblong, glandular. MALE. *Racemes* axillary, solitary, longer than the leaves, bearing many small, white flowers, on long pedicels. *Petals* obovate. *Filaments* three, two with twin anthers. FEMALE. *Peduncles* axillary, solitary, shorter than the petiole, one-flowered. *Petals* as in the male. *Style* three-cleft; *divisions* two-parted. *Fruit* oval, of the size of a nutmeg, armed with numerous, long, rather soft, diverging bristles, obscurely divided into three cells, by numerous dry fibres; opening at top with a stopple. *Seeds* several, ovate, compressed, scabrous, black.

8. L. *Bindaal. R.*

Dioecous, scandent. *Leaves* five-angled, dentate. *Male flowers* racemed; the *female* solitary; *fruit* round, echinate, with long, firm, straight, ciliate bristles.

Found by Captain Hardwicke in Hindoosthan.

9. L. *tuberosa. R.*

*Root* tuberous and perennial. *Leaves* from five to seven-lobed, dentate. *Male flowers* on very short racemes; the *female* ones solitary, long-peduncled. *Fruit* oblong, with eight sharp ridges.

This is a rare species; it grows in hedges, and amongst bushes on the banks of water courses.

*Root* perennial, tuberous, turnip-shaped, with small warts over it, and here and there fibrous roots from these warts. *Stems* slender, five-sided, climbing, smooth. *Tendrils* simple. *Leaves* cordate, from five to seven-angled, toothed or serrate, smooth, about two inches each way. MALE FLOWERS a few on short, axillary racemes, white. *Filaments* two, one bearing three anthers, and the other two. FEMALE FLOWERS axillary, solitary, long-peduncled, white. *Fruit* in form exactly like that of L. *amara*, but without the stopple, and with

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only eight angles, about an inch and a half long, and half an inch in diameter; internal structure as in the last described three species.

*CUCURBITA. Schreb. gen. N.* 1478.

*Male calyx* five-toothed. *Corol* five-cleft. *Filaments* three. *Female calyx* and *corol* as in the male. *Seeds* with a tumid margin.

1. C. *lagenaria. Willd.* iv. 606.

*Leaves* somewhat angular, tomentose, bi-glandular at the base underneath. *Fruit* with a woody cortex.

Bela-schora. *Rheed. Mal.* viii. *t.* 1.

Cucurbita Lagenaria. *Rumph. Amb.* v. *t.* 144. bad.

*Beng.* Kudoo, Laoo.

*Sans. U*lava.

A wild bitter variety is called T*ita* Laoo, by the Bengalees and Hindoos; and K*utoo toom*bee in Sanscrit.

The shape of the fruit varies much, from that of a flask to round, and cylindric.

2. C. *Pepo. Willd.* iv. 609.

*Leaves* angular, toothed, very downy. *Fruit* sub-cylindric, both ends obtuse, surface very even.

Cumbulam. *Rheed. Mal.* viii. *t.* 3.

*Sans.* Kurkar*oo.*

*Beng.* K*oomra.*

*Teling.* Boorda-*goomoodoo.*

This plant I have only found in a cultivated state.

*Root* annual. *Stem* and *branches* numerous, &c. as in C. *Melo-pepo* but exceedingly hairy. *Tendrils* lateral, generally three-cleft. The first or lower leaves angular, the exterior from five to nine-angled, all toothed, remarkably soft and downy, from four to six inches long, and about the same breadth. *Petioles* round, tapering, hairy. *Sti-*

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*pules* axillary, solitary. MALE FLOWERS axillary, solitary, peduncled, yellow, pretty large. *Calyx*, its segments obtusely pinnatifid. FEMALE FLOWERS like the male, axillary, solitary, peduncled. *Calyx* as in the male. *Fruit* sub-cylindric, without the least elevation or depression of its surface, remarkably obtuse at both ends, when young exceedingly hairy, by the time it is ripe the hair is gone, and it is then of a whitish bloom colour, about twelve or eighteen inches long, and from eight to ten in diameter. *Seeds* white, with tumid margins, somewhat two pointed.

The young unripe pomes are universally eaten by the natives in their stews, and curries.

3. C. *melopepo. Willd.* iv. 610.

*Leaves* angular-lobed, dentate, hairy; *divisions* of the calyx petioled. *Fruit* roundish, smooth, torulose.

Schakeri-schora. *Rheed. Mal.* viii. *t.* 2.

Suphura-koomra of the Bengalees.

Cultivated like the former two all over India.

4. C. *Citrullus.*

*Leaves* many-parted.

Anguria Indica. *Rumph. Amb.* v. *t.* 146.

*Hind.* Turbooz or Turmooj.

Extensively cultivated in all the southern parts of Asia, and its islands.

*CUCUMIS. Schreb. gen. N.* 1479.

*Male calyx* five-toothed; *corol* five-parted. *Filaments* three. *Female calyx* and *corol* as in the male. *Seeds* sharp.

1. C. *Colocynthis. Willd.* iv. 61.

*Leaves* many-cleft. *Fruit* globular, smooth.

*Pers.* Chebooz or Khirboo-lekh.

*Teling.* Sheti-putsa.

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*Beng.* Makhal.

Common on the sandy lands of Coromandel.

2. C. *Melo. Willd.* iv. 613.

*Angles* of the leaves rounded. *Fruit* roundish, torulose, smooth.

*Hind. Pers.* and *Beng.* Khurbooj.

Found in a cultivated state only.

3. C. *sativus. Willd.* iv. 615.

*Leaves* straight between the angles. *Fruit* linear-oblong, scabrous.

Mullen belleri. *Rheed. Mal.* viii. *t.* 6.

*Hind.* Keera.

*Beng.* Susa.

*Pers.* Khyar.

This and some of its varieties are found cultivated in most parts of Asia.

4. C. *momordica. R.*

*Leaves* round-cordate, sometimes five-angled, scollop-toothed; *male flowers* fascicled; the *female* solitary. *Fruit* smooth, cylindric, from four to eight pounds weight, bursting spontaneously.

*Beng.* and *Hind.* Foont or Tooti.

*Teling.* Pedda dosray.

This species I have only found in a cultivated state. In the Tanjore country, and the southern parts of the Carnatic, it is chiefly cultivated during the cold season. The plant is in all respects like that of the common cucumber, except that it is less scabrous, and larger.

MALE FLOWERS axillary, peduncled, crowded. FEMALE FLOWERS solitary, peduncled. *Fruit* very smooth, oblong, generally tapering a little towards the ends with elevation or depression; from twelve to twenty-four inches long, and from three to six in diameter, when ripe bursting slowly into various portions. *Seeds* as in C. *sativus.*

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The fruit is much eaten both by natives and Europeans; when young they are a good substitute for the common cucumber, and when ripe (after bursting spontaneously,) with the addition of a little sugar they are little inferior to the melon, and reckoned very wholesome.

5. C. *utilissimus. Roxb.*

*Leaves* five-lobed; *lobes* rounded, and toothletted. *Flowers* axillary; the *male* flowers crowded; the *female* solitary. *Fruit* short-oval, smooth, variegated, of the size of a small melon.

*Teling.* Dosray.

*Beng.* Kakri.

An annual, a native of the higher cultivated lands, but generally found in a cultivated state; the cold season is the most favourable.

*Stems* exactly as in C. *sativus*, but not quite so extensive. *Tendrils* simple. *Leaves* broad-cordate, generally more or less five-lobed; *lobes* rounded, toothletted; above pretty smooth, below scabrous, the largest generally about six inches each way. *Floral leaves* of the female flowers sessile, and very small. MALE FLOWERS axillary, peduncled, crowded, but opening in succession. FEMALE FLOWERS axillary, peduncled, solitary, both sorts yellow, about an inch or an inch and a half in diameter. *Fruit* fleshy, generally a very perfect oval; when young downy and clouded with lighter and darker green; when ripe perfectly smooth, variegated with deeper and lighter yellow; from four to six inches long, and from three to four in diameter.

This appears to me to be by far the most useful species of *Cucumis* that I know; when little more than one half grown, they are oblong, and a little downy, in this state they are pickled; when ripe they are about as large as an ostrich's egg, smooth and yellow; when cut they have much the flavor of the melon and will keep good for several months, if carefully gathered without being bruised and hung up; they



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are also in this stage eaten raw and much used in curries, by the natives.

The seeds like those of the other *Cucurbitaceous* fruits contain much farinaceous matter blended with a large portion of mild oil; the natives dry and grind them into a meal, which they employ, as an article of diet; they also express a mild oil from them, which they use in food and to burn in their lamps. Experience as well as analogy prove these seeds to be highly nourishing and well deserving of a more extensive culture than is bestowed on them at present.

The powder of the toasted seeds mixed with sugar is said to be a powerful diuretic, and serviceable in promoting the passage of sand or gravel.

As far as my observation and information goes, this agriculture is chiefly confined to the Guntoor Circar, where these seeds form a considerable branch of commerce; they are mixed with those of *Holcus Sorgum* or some other of the large culmiferous tribe and sown together; these plants run on the surface of the earth, and help to shade them from the sun, so that they mutually help each other.

The fruit I observed above keeps well for several months if carefully gathered and suspended. This circumstance will render them a very excellent article to carry to sea during long voyages.

6. C. *trigonis. R.*

*Leaves* deeply five-lobed; *lobes* rounded, toothed. *Fruit* oval, obsoletely three-sided, ten-striated, smooth, of the size of a pullet's egg.

*Teling.* Pam-budinga.

The plant of this species resembles very much the last described one; it is never cultivated, is a native of the higher lands that have been lately cultivated; appears and flowers during the wet and cold seasons.

*Stems* like those of the last described species. *Tendrils* also simple, the leaves are more deeply lobed and rather more

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scabrous. *Flowers* small, scarcely half an inch in diameter, yellow; situation as in the last mentioned species. The specific difference is in the fruit; this is also oval and smooth, but three-sided with the angles round and the surface streaked with ten light, and ten deep, well defined streaks of deeper and lighter yellow; before maturity these are of a deeper and lighter green colour. It is about the size of a pullet's egg. They are not eaten in these parts.

7. C. *turbinatus. R.*

*Leaves* palmate, lobes sinuate and bristle-dentate. *Fruit* turbinate, absolutely three-sided, the size of a pullet's egg.

*Teling.* Nalla budinga.

This species is a native of the same places as the last, but differs from it in the plant being small, having much larger flowers, and pyriform maculated fruit; they are also somewhat triangular, and about the same size, the leaves are also more deeply lobed and bristle-toothed. The fruit of this sort is eaten by the natives.

8. C. *madraspatanus. Willd.* iv. 615.

*Leaves* sub-reniform, somewhat lobate-toothed. *Pomes* oval, downy.

*Hind.* Bun-gumuk.

*Teling.* Kodee-budinga.

Till I saw Plukenet's figure of C. *madraspatanus*, I considered this to be the plant he meant, but now I hesitate not to say, that his is *Bryonia scabrella;* however I have continued Linnæus's specific name, although at the same time, I am in doubt whether or not this is the plant he so named. It is much like the two last described species, grows in similar places, is about the same size, and in perfection at the same season, the leaves are more like those of the common cucumber, the fruit about the size of a partridge's egg, oval, downy, maculated, without any tending to be three-sided.



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*Note.* The form of the fruit must be attended to, to distinguish these three last described species.

The fruit of this sort is used in food by the natives and much esteemed, yet they never take the trouble to cultivate the plant.

9. C. *integrifolia. Roxb.*

*Leaves* sub-rotund, almost destitute of angles, very rugose, posterior lobes rounded, both male and female flowers solitary. *Fruit* globular, smooth.

A native of Bengal, blossoming and ripening its seeds during the rains.

*Stems* annual, creeping to a great extent, and exceedingly ramous, angular and hairy. *Leaves* sub-rotund, with scarcely any angles, or rather marginal inequalities, deeply sinuated behind, with the lobes rounded, very rugose, scabrous above and hairy underneath, from three to six inches each way. MALE FLOWERS solitary, long-peduncled, large, pure white, pubescent. FEMALE FLOWERS also solitary, but shorter peduncled, pure white and pubescent. *Fruit* globular, of the size of a nutmeg, smooth, when ripe of an orange colour.

*BRYONIA. Schreb. gen. N.* 1480.

*Male calyx* five-toothed. *Corol* five-parted. *Filaments* three. *Female calyx* and *corol* as in the male. *Berry* few or many-seeded.

1. B. *scabrella. Willd.* iv. 619.

*Leaves* five-angled, toothed, scabrous, the male flowers petioled, and the female ones sessile. *Berries* globular, many-seeded. *Seeds* smooth.

*Hind.* Agumuki.

*Teling.* Puten budinga.

Cucumis Madraspatensis fructo minimo. *Pluck.* 123. *t.* 70. *f.* 2.

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A native of various parts of India, growing on rubbish, and in hedges. Flowering time the wet and cold seasons, and the seed ripens during the latter.

*Stem* climbing, as thick as a pack-thread, five-grooved, five-angled, hispid. *Tendrils* simple. *Leaves* alternate, the lower ones and those of the larger ramifications have male, or no flowers in their axills, and are petioled; the superior ones are sessile, and have generally the female flowers, all cordate, angled, toothed, and scabrous; two inches long, and of the same breadth. MALE FLOWERS axillary, crowded, peduncled, small, yellow. *Anthers* three, one on each filament, oval. FEMALE FLOWERS axillary, from two to four, subsessile. *Berry* globular, of the size of a large pea, smooth, striated. *Seeds* several.

2. B. *tenella. Roxb.*

Filiform, creeping. *Leaves* from three to five-angled, denticulate, slightly scabrous. *Flowers* axillary, two male, and one female. *Berries* oblong, smooth.

A native of China, in the Botanic garden it blossoms during the rains, and ripens its seed in the cool season.

*Root* fibrous, white, rather fleshy, and at least biennial. *Stems* and *branches* numerous, filiform, creeping, pretty smooth. *Leaves* petioled, from three to five-angled, denticulate, slightly scabrous, particularly underneath, about one inch long, and nearly as broad. *Tendrils* simple. *Flowers* axillary, two male, and one female together, each on its proper peduncle, small, pure white; the male rather large. *Filaments* three, from the bottom of the bell of the calyx or corol, each with a large fleshy lid, on each side of which is a single anther crested behind with a tuft of orange-coloured hairs. *Germ* oblong. *Style* filiform. *Stigma* large, three-lobed. *Berries* oblong, very smooth, when ripe white, of the size of a French bean, many-seeded.

3. B. *glabra. Roxb.*

Herbaceous. *Stems* round and smooth. *Leaves* from

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three to five-lobed; *lobes* scollop-toothed. *Berries* conical, smooth.

Compare with B. *epigaea. Willd.* iv. 619.

*Teling.* Naga-donda.

It grows in places similar to the former species, and flowers at the same seasons.

*Stems* annual, climbing, seldom as thick as a quill, round, smooth, jointed, often bending at the joints in a right angle. *Tendrils* simple. *Leaves* petioled, three-lobed; lateral lobes often two-parted, and the anterior, from one to three-parted, all are remotely and slightly toothed, somewhat fleshy and a very little scabrous; about two inches each way. *Petioles* round, smooth. MALE FLOWERS small, yellow, several collected on the apex of a round, smooth, common peduncle; each half its proper, short pedicel, and bracted at its insertion. FEMALE FLOWERS axillary, solitary, or accompanied with a male raceme, short-peduncled. *Berry* conical, smooth, red, many-seeded.

4. B. *pilosa. Roxb.*

Herbaceous, hairy. *Leaves* round cordate, toothed, downy. *Male flowers* on a short filiform raceme. *Berries* beaked, hairy, from two to six-seeded.

Compare with B. *rostrata. Willd.* iv. 616.

*Teling.* Cucuma-dunda.

It grows with the former three species, and flowers at the same time.

*Stems* annual, climbing, five-sided, hairy. *Tendrils* simple. *Leaves* petioled, round, cordate, toothed, downy, from one to two inches each way. MALE FLOWERS axillary, generally two on a long delicate peduncle. FEMALE FLOWERS single, sessile in the same axill. *Berry* sub-conical, of the size of a cherry, red, striated lengthways, hairy. *Seeds* from two to six, black, with a membranaceous border.

*Note.* These three last described species are not employed for any use that I know of. That part of the Hindoo name of

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the second of them, Naga, would imply that it was employed as a remedy for the bite of the Cobra Capella; but I could not procure any good authority for its being so.

5. B. *Garcini. Willd.* iv. 623.

*Leaves* deeply three or five-lobed, toothed, scabrous. *Stipules* and *bractes* ciliate. *Berries* inverse, reniform, two-seeded.

Sicyos Garcini. *Linn. Mant.* 297. *Burm. Ind.* i. *t.* 57. *f.* 3.

*Teling.* Gudee Muraloo.

This species delights in soil and situation similar to the last mentioned three.

*Stems* annual, climbing, slender, five-sided, somewhat scabrous. *Tendrils* simple. *Leaves* petioled, three-parted having the lateral lobes, from two to three-parted, all toothed, scabrous, a little hairy, two inches each way. *Petioles* scabrous, nearly as long as the leaves, and thicker than the ramifications from which they issue. *Stipules* axillary, solitary, kidney-formed, waved, fringed with long bristles. *Racemes* axillary or terminal, ornamented with small leaves and bractes like those already described. *Male flowers* above the female ones. *Berries* small, inversely kidney-formed, smooth, red, two-seeded.

6. B. *filiformis. Roxb.*

*Stems* filiform, five-sided, tendrils simple. *Leaves* cordate, sagittate, dentate, slightly scabrous. *Peduncles* as large as the petioles. *Female flowers* solitary, the male collected. *Berries* oblong, smooth.

A native of the Moluccas, and from thence introduced into the Botanic garden where it blossoms during the cold season.

*Stems* climbing, very slender, five-sided, smooth. *Tendrils* simple. *Leaves* petioled, cordate-sagittate, with dentate margins, and the posterior lobes large, and nearly square, both sides being highly scabrous, from one to two inches long. *Petioles* angular, a little hairy, about as long as the leaves.

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*Male peduncles* sub-axillary, solitary or with a female peduncle, slender, rather shorter than the petioles, bearing at the apex several sessile, small, yellow flowers. *Calyx* and *corol* as in the genus. *Filaments* three, very short, inserted into the middle of the tube of the calyx. *Anthers* three, simple, obovate, sub-sessile. *Female peduncles* sub-axillary, solitary, or with a male peduncle, and about the same length, one-flowered, slender, smooth. *Calyx*, *corol* and *pistil* as in the genus. *Berry* oblong, very smooth, slightly marked, while immature, having ten longitudinal stripes; when ripe of an uniform blackish olive colour, nearly an inch long, and about a third thereof in diameter, three-celled, with several small red, flat, ovate seeds in each.

7. B. *laciniosa. Willd.* iv. 624.

*Leaves* palmate. *Petioles* muricate. *Male flowers* fascicled; the *female* solitary in the same axill. *Berries* spherical, smooth, three-celled. *Seeds* many, with a pulpy aril, callous margins, and gibbous, callous sides.

Nehoemeka. *Rheed. Mal.* viii. *t.* 19.

*Hind.* Gargoo naroo.

Common in hedges, and among bushes in the warmer parts of India, and in blossom the greatest part of the year.

## MONOECIA GYNANDRIA.

### *ANDRACHNE. Schreb. gen. N.* 1483.

*Male calyx* five-leaved. *Corol* five-petalled, or none. *Stamina* five, inserted on the abortive style. *Female calyx* five-leaved. *Corol* none. *Germ* superior, three-celled; *cells* two-seeded; *attachment* superior. *Styles* three. *Capsule* berried, three-celled; *cells* from one to two-seeded. *Embryo* inverse, and furnished with a perisperm.

1. A. *trifoliata. Roxb.*

Arboreous. *Leaves* ternate. *Flowers* panicled.

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A large tree of quick growth; a native of various parts of India. Flowering time the close of the winter, the seed ripens in May and June.

*Trunk* erect; *bark* smooth, of a dark olive colour. *Branches* numerous, forming an extensive, close, shady, ovate head. *Branchlets* frequently drooping much. *Leaves* alternate, petioled, ternate. *Leaflets* petioletted, oblong, with long, sharp, taper points, serrate, smooth on both sides, from four to six inches long. *Petioles* round. *Petiolets* channelled. *Stipules* of the petioles membranaceous, caducous; those of the petiolets minute, filiform, caducous, leaving a black gland-like speck behind. *Panicles* axillary, or a little above, about as long as the leaves, those of the male drooping, those of the female when dioecous, sub-erect. MALE FLOWERS sometimes on a separate tree, sometimes on the same, numerous, small, before expansion vertically compressed and five-lobed, of a pale greenish yellow colour. *Calyx* five-leaved; *leaflets* nearly round, concave, expanding. *Corol* none. *Nectary* none. *Filaments* five, opposite, shorter than the leaflets of the calyx, inserted into the abortive style a little below its ten-rayed peltate crown. *Anthers* two. *Germ* none. *Style* short, thick. *Stigma* peltate, ten-rayed. FEMALE FLOWERS whether on the same, or on a different tree, solitary, short-pedicelled, with a lanceolate bracte beneath each. *Calyx* five-leaved. *Corol* none. *Nectary* or *nectarial glands* five, roundish, sub-sessile, within the leaflets of the calyx, much like fertile anthers. *Germ* superior, round, three-celled, with two ovula in each, attached to the upper end of the axis. *Styles* three, recurved, undivided. *Stigma* simple. *Capsule* more like a berry on the outside, of the size of a small cherry, round, smooth, three-celled, with one or two seeds in each. *Embryo* curved, inverse, amply furnished with a perisperm.

*CLUYTIA. Schreb. gen. N.* 1526.

*Male calyx* five-leaved. *Corol* five-petalled. *Stamina*



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five, inserted into the abortive style. *Female calyx* and *corol* as in the male. *Styles* three, two-cleft. *Capsule* trilocular. *Seed* solitary.

1. C. *semperflorens. R.*

Shrubby, erect. *Leaves* sub-lanceolar, acute. *Male flowers* in axillary, and lateral glomerules; the *female* ones few and apetalous.

A small, erect, ramous shrub; a native of Silhet, where it is in flower and seed the whole year round.

*Stem* erect, short, soon dividing into a few erect, and spreading branchlets. *Bark* of the old ligneous parts dark brown, and scabrous; that of the tender shoots, densely clothed with short hairs. *Leaves* alternate, short-petioled, sub-lanceolar, tapering most toward the base and there somewhat cordate, with a very few hairs on the rib and veins, all the rest smooth, about six inches long, by two broad. *Stipules* small and subulate. *Flowers* short-pedicelled, forming crowded, roundish glomerules over the leafless branches, chiefly axillary, the male ones very numerous and purple, the female ones large, few and green. *Male calyx*, five unequal, spreading, small oval leaflets. *Petals* five, round, obovate, spreading, of a deep purple. *Nectary*, five glands alternate with the insertion of the petals. *Filaments* single, columnar. *Anthers* six, placed in a stellate form round the apex of the column, and open on the under side. *Female calyx* five-leaved. *Corol* none. *Nectary*, a pentagonal ring round the base of the germ. *Germ* superior, roundish, hairy, three-celled, with one ovulum in each, attached to the axis above its middle. *Styles* three, bifid, recurved. *Capsule* the size of a large pea, of an olive colour, villous, tricoccous. *Seeds*, *perisperm* and *embryo*, as in the order.

2. C. *oblongifolia. R.*

Arboreous. *Leaves* alternate, short-petioled, oblong, acute, smooth, glaucous underneath. *Flowers* sessile, crowded, axillary. *Petals* obcordate, tridentate.

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A middling sized tree, a native of the forests of Silhet, where it is called Dookesa. It furnishes the natives with hard durable wood, fit for various economical purposes. Flowering time the end of the hot season; the seed ripens in August and September.

*Twigs* straight, slender and smooth. *Leaves* alternate, bifarious, short-petioled, oblong, entire, sub-acuminate, having the upper surface polished, and the under one glaucous, from four to six inches long, by two and a half broad. *Flowers* numerous, sessile, small, crowded into little, round, axillary heads, or in little lateral and terminal spikes. *Bractes* numerous amongst the flowers, small and hairy. *Calyx* in both male and female five-parted, permanent; *segments* tapering and smooth. *Petals* in both five, generally smaller than the calyx, obcordate, three-toothed. *Stamens* in the male flowers five, inserted on a column, as in the genus. In the female ones none. *Germ* superior, the base embraced by a five-toothed cup. *Styles* and *stigmas* as in the genus. *Capsule* short-pedicelled above the permanent calyx, of the size of a cherry, smooth, three-lobed, three-celled, six-valved. *Seed* solitary, with inverted embryo, as in the other *Euphorbiæ*.

3. C. *diversifolia. R.*

*Leaves* sub-sessile, from obovate and obtuse to broad-lanceolate and acute, smooth and entire. *Stipules* ensiform. *Flowers* axillary, sessile. *Petals* obovate. *Stigmas* three-cleft.

A native of the Malay Islands.

*Branchlets* downy. *Leaves* bifarious, short-petioled, from oblong and obtuse, to broad-lanceolate and acute, all entire and smooth on both sides, from four to five inches long. *Stipules* ensiform, downy. *Flowers* axillary, male and female mixed, both perfectly sessile, and scarcely longer than the stipules. *Male calyx* of five acute, erect, smooth segments. *Petals* five, roundish, obovate, inserted by short claws on the



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outer edge of the nectary. *Nectary* saucer-shaped. *Column* with five expanding filaments, inserted above its middle, above their insertion three-cleft. *Anthers* incumbent. *Female calyx, corol* and *nectary* as in the male. *Germ* hairy. *Styles* three. *Stigmas* trifid.

4. C. *collina. Willd.* iv. 883. *Roxb. Corom. pl.* ii. *N.* 169.

*Leaves* sub-sessile, oval, smooth, entire. *Flowers* axillary, *Leaflets* of the calyx lanceolate. *Petals* minute. *Capsules* tricoccous.

*Tam.* Woodacha-marum.

*Teling.* Kadishen.

A small tree, a native of the hilly parts of the Circars. It flowers during the hot season. The seed ripens in December and January.

*Leaves* alternate, short-petioled, bifarious, the smaller ones orbicular, the larger obovate, entire, smooth, shining, size various. *Stipules* small, acute, hairy, falling. *Flowers* short-peduncled, middle size, green, sometimes the male and female ones are mixed in the axills of the same leaves; sometimes the male flowers are collected by themselves in little bundles in the axills, and the female ones solitary in distinct axills, and sometimes again it happens that they occupy different trees. *Bractes* several, very minute, surrounding the insertion of the peduncles. *Male calyx* split to very near the base, into five segments; *divisions* tapering, withering. *Petals* five, very minute, lanceolate. *Nectary* saucer-formed. *Stamens*, in the centre of the nectary there is a cylindric column from which, near the apex, there issue five ascending filaments. *Anthers* oblong, erect. *Pistillum* no other than the forementioned column. *Female calyx* and *corol* as in the male. *Nectary* cup-formed, closely embracing half the germ; margin slightly notched. *Germ* superior, ovate. *Styles* three, each two-cleft. *Stigmas* simple. *Capsule* somewhat three-lobed, smooth, very hard, three-celled, six-valved, the size of a nutmeg. *Seeds*, only one in each cell comes to maturity,

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though when young there are the rudiments of two, round, smooth, of the size of a pea.

The bark, or outer crust of the capsule is reported to be exceedingly poisonous. The wood of the tree is of a reddish colour, exceedingly hard, and durable.

5. C. *patula. Willd.* iv. 884. *R. Corom. pl.* ii. *N.* 170.

*Leaves* ovate-oblong, pointed, smooth, entire. *Flowers* axillary, or on axillary spikes. *Petals* round, crenulate, clawed. *Capsules* tricoccous.

A much larger tree than *collina*, a native of moist valleys amongst the Circar mountains. It flowers during the hot season.

*Trunk* straight, from fifteen to twenty feet to the branches. *Bark* pretty smooth, dark-coloured, thin and hard. *Branches* very numerous, spreading horizontally, and forming a large shady head. *Branchlets* bifarious, twiggy. *Leaves* alternate, short-petioled, bifarious, oblong, attenuated to a long, slender point, entire, smooth, shining, about three inches long, by one and a half broad. *Stipules* small. *Flowers* nearly sessile, male and female collected in little bundles in the axills, sometimes on small axillary, interrupted spikes. *Bractes* small, numerous, chaffy, surrounding the insertions of the flowers. *Male calyx* as in the former species. *Petals* five, orbicular, crenulate, many times smaller than the calyx, inserted by claws. *Nectary* saucer-shaped. *Stamens* as in the former species. *Female calyx* and *corol* as in the male. *Nectary* cup-formed, embracing only about a third of the germ. *Germ* superior, ovate, hairy. *Styles* three, two-cleft. *Stigmas* small. *Capsule* the size of a small cherry, three-celled, three-valved. *Seed* solitary.

The wood of this tree is of the colour of dried rose leaves, also hard and durable.

## *BRIEDELIA. Willd.*

*Male calyx* five-parted. *Corol* five-petalled, inserted on

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the calyx. *Stamina* five, inserted on the abortive style. *Female calyx* and *corol* as in the male. *Germ* superior, two-celled; *cells* two-seeded; *attachment* superior. *Styles* two, bifid. *Berry*, or *drupe* two-seeded. *Embryo* inverse and furnished with a perisperm.

1. B. *crenulata. Roxb.*

*Leaves* linear, oblong, scarcely crenulate, tomentose underneath. *Flowers* axillary, crowded, sessile.

A large timber tree, a native of the mountainous countries near the mouth of the river Megna, from thence sent by Stephen Harris, Esq. to the Botanic garden, where after twelve years, it blossomed in May and the seed ripened in October. This will belong to that division of my *Cluytias*, which Willdenow, in his edition of the *Species Plantarum* of *Linnæus. vol.* iv. *p.* 978, has very properly made a distinct genus, under the name *Briedelia.* I do not, however, remember to have found any of the flowers hermaphrodite, in any of the species.

*Trunk* tolerably straight, in trees twelve or thirteen years old, four feet above the earth, from two to three feet in circumference, covered with deeply cracked, ash-coloured bark. *Branches* expanding; *young shoots* round and villous, while the trees are young a few long sharp spines are found thinly scattered over the trunk and large branches. *Leaves* alternate, bifarious, short-petioled, linear-oblong, or elliptic, obtuse, slightly crenulate, of a firm texture, smooth above, downy underneath, with numerous, simple and parallel veins, from two to four inches long, and about half that in breadth. *Stipules* ensiform, caducous. *Thorns*, on our young trees, a few long straight, simple ones are found on the trunk and large branches. *Flowers* axillary, sessile, crowded, small, pale yellow, the male ones on one tree, and the female ones on another. *Male calyx* five-leaved, or to the base five-cleft; *leaflets* ovate, acute. *Petals* oval, notched, long-clawed. *Nectary* acetabuliform. *Filaments* inserted on the column, below its bidentate apex. *Female calyx* and *exterior nec-*

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*tary* as in the male. *Petals* lanceolar; the *inner nectary* pitcher-shaped, enveloping the germ; its contracted mouth five-toothed. *Germ* ovate, two-celled, with two ovula in each, attached to the top of the partition. *Styles* two, short, two-cleft. *Stigmas* simple. *Drupe* superior, round, of the size of a large pea, succulent, when ripe of a shining black, two-celled. *Nuts* hemispherical, rugose, the exterior or convex side, one-celled. *Seed* conform to the nut. *Integument* single, thin. *Perisperm* conform to the seed, rather hard. *Embryo* inverse. *Cotyledons* retuse. *Radicle* oblong, superior.

2. B. *montana. Willd.* iv. *p.* 978.

*Leaves* long obovate, entire, smooth. *Flowers* axillary, sessile. *Petals* roundish, clawed. *Berry* two-celled.

Cluytia *montana. Roxb. Corom. pl.* ii. *N.* 171.

*Teling.* Pantenga.

On the interior mountains it grows to be a tree, on the lower lands it does not grow so large.

*Trunk* erect, short and thick. *Branches* numerous, spreading. *Branchlets* bifarious, twiggy. *Leaves* alternate, short-petioled, bifarious, obovate, or wedge-formed, smooth, entire, from two to three inches long, broad in proportion. *Stipules* small, acute, withering. *Flowers* small, green, axillary, crowded, sessile, the male and female mixed. *Bractes* minute, numerous, withering. *Male flowers* exactly as in *Cluytia patula. Female calyx, corol* and *nectary* as in *Cluytia patula. Germ* superior, ovate, two-celled, with two ovula in each, attached to the top of the partition. *Styles* two, two-cleft. *Stigmas* simple. *Berry* globular, succulent, of the size of a pea. *Seeds* two, oval, one side flat, the other convex.

The wood of this tree like the two former is very hard and of a reddish colour.

3. B. *spinosa. Willd.* iv. *p.* 979.

Arboreous. *Leaves* oblong, entire, smooth. *Flowers*

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spiked. *Petals* round, curled, clawed. *Nectary* in the male flowers double. *Berries* two-sided.

*Cluytia spinosa. Roxb. Corom. pl.* ii. *N.* 172.

*Teling.*, Kora man.

This is a tree of considerable size, a native of the Circar mountains, as well as of various parts of Bengal, where it blossoms during the rainy season, chiefly in July, and the seeds ripen in December.

*Trunk* straight. *Bark* scabrous. *Branches* disposed as in the last. *Thorns* a few over the larger branches, large and strong. *Leaves* also disposed in the same manner, oblong, pointed, entire, firm, smooth, with many parallel protuberant veins running from the centre to the circumference, about five inches long, and two and a half broad. *Spikes* axillary or terminal, glomerate; flowers collected in bundles leaving the interstices naked. *Flowers* small, of a greenish yellow, male and female mixed. *Male calyx* and *corol* as in the two last species. *Nectary* double, the exterior saucer-shaped and the interior cup-shaped, sitting on the exterior, or that which is saucer-shaped, and divided to near the base, into five segments; divisions narrowing towards the point, with the extremities three-toothed. *Stamens; filaments* five, inserted into in erect column. *Female calyx* and *corol* as in the male. *Nectary* gibbous, surrounding the germ entirely, and leaving only a small opening for the styles to pass, and there five-toothed. *Germ* ovate. *Styles* two, two-cleft. *Stigmas* simple. *Berry* globular, of the size of a pea, succulent, black. *Seeds* two.

The bark is a strong astringent. The wood dark coloured, hard and durable. Cattle eat the leaves greedily; they are said to destroy worms in their bowels.

4. B. *scandens. Willd.* iv. *p.* 979.

Shrubby, scandent. *Leaves* oblong, downy underneath. *Petals* roundish, crenulate, clawed.

*Cluytia scandens. Roxb. Corom. pl.* ii. *N.* 173.

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Scherunam cottam. *Rheed. Mal.* ii. *t.* 16.

*Teling.* Doonkiboora.

A large, woody, climbing species, common on banks of rivers and water courses in the Circars. It flowers in November and December.

*Trunk* scarcely any; *branches* long, climbing, with their extremities flower-bearing and pendulous. *Bark* ash-coloured. *Leaves* alternate, short-petioled, bifarious, oval, entire, downy underneath, various in size. *Stipules* cuneiform, as long as the petioles. *Flowers* small, of a yellowish green, either axillary, crowded, and sessile, or interrupted, leafy, terminal, or axillary, generally male on one branch, and female on another. *Male flowers* as in *Cluytia patula*, except that in this species, the petals are not at their extremities. *Female calyx* and *corol* as in the male. *Nectary*, double as in *Briedelia spinosa*, and in every respect the same. *Germ* superior, ovate, hid in the inner nectary, two-celled, with two ovula in each, attached to the middle of the partition. *Styles* two, two-cleft. *Stigmas* simple. *Berry* oblong, juicy, smooth, of the size of a large field bean, when ripe it is of a rusty black colour. *Seeds* two. *Embryo* inverse and furnished with a perisperm.

5. B. *lanceæfolia. R.*

Monoecous. *Leaves* broad-lanceolar, obtuse, smooth, glaucous underneath. *Flowers* axillary, crowded, sessile. *Petals* roundish, dentate. *Berries* globular.

A tree of considerable size and quick growth, a native of Bengal. In the Botanic garden, they have attained to the height of twenty feet in four years, thick and ramous in proportion. They blossom at various times of the year, but chiefly about the close of the rains, and the small, round, dark purple berries ripen in the cool season.



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# CLASS XXII.

## DIOECIA MONANDRIA.

### *PANDANUS.*

*Male spadix* compound; *spathes* alternate, ensiform. *Proper perianth* none. *Corol* none. *Anthers* inserted on the ramification of the spadix. *Female spadix* strobiliform; *spathes* in three fascicles. *Perianth proper*, none. *Corol* none. *Germs* from one to many-celled; *cells* seeded; *attachment* inferior. *Fruit* compound.

1. P. *odoratissimus. Willd.* iv. 645.

*Ramifications* of the male spadix compound. *Drupes* of the compound fruit turbinate, each containing a many-celled nut.

*Sans.* Ketuka.

*Hind.* Keura.

*Beng.* Kea.

Mellore, or Nicobar bread fruit. *Asiat. Res.* iii. 161.

Kaida. *Rheed. Mal.* ii. *t.* 1. 5.

P. *odoratissimus. R. Corom. pl. N.* 94, 95, 96.

P. verus. *Rumph. Amb.* iv. *t.* 74.

Anthrodactylis spinosa. *Forst. gen. N.* 75.

Keyro. *Forsk. Ægypt.* 172.

Mugalik is the Telinga name of the male plant, and Gozdoogoo that of the female. Kaldera is the name they are known by amongst Europeans on the coast of Coromandel. It is a native of all the warmer parts of Asia, all soils and situations seem to suit it equally well. It flowers chiefly during the rainy season.

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*Trunk*, now and then a plant may be found with a single, pretty erect one, from ten to twelve feet in height, and a ramous round head; but this is seldom, for it is generally in form of a very large, ramous, spreading bush; from the stems, or larger branches, long, fusiform, obtuse-pointed roots issue, descending till they come to the ground which they enter and then divide. The substance of the most solid wood is something like that of a cabbage stem, which by age acquires a woody hardness on the outside. *Leaves* confluent, stem-clasping, closely imbricated in three spiral rows, round the extremities of the branches, drooping, from three to five feet long, tapering to a very long, fine, triangular point, very smooth, and glossy, margins and back armed with very fine sharp spines, all those on the margins point forwards, those of the back point sometimes one way and sometimes the other. *Male inflorescence* terminal, a large pendulous, compound, leafy panicle, the leaves thereof are white, linear-oblong, pointed and concave, in the axill of each there is a single thyrse composed of simple, small racemes of long, pointed, depending anthers, which are not sessile, but raised from the rachis of these partial racemes by tapering filaments, hence I call these parts of the thyrse racemes and not spikelets. *Female flowers* on a different plant, terminal, and solitary, having no other calyx, or corol than the termination of the three rows of leaves forming three imbricated fascicles of white floral leaves or involucres, like those of the male racemes, only here they stand at equal distances round the base of the young fruit. *Germs* numerous, collected into firm, wedge-shaped, angular bundles, of from six to ten; these form the compound germs of the future fruit, and are closely impacted round the receptacle. *Style* none. *Stigmas* single, on each undivided germ, oval, grooved lengthways, yellow, affixed to the outside of a two-lipped umbilicus, on the apex of the germ. *Pericarp; fruit* compound, oval, from six to eight inches in diameter, and from six to ten long, weighing from four to eight pounds, rough, of a rich orange colour, com-



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posed of numerous, wedge-shaped, angular drupes, when ripe their large or exterior ends are detached from one another, and covered with a firm, deeper or orange-coloured skin; apices flat, consisting of as many angular, somewhat convex tubercles as there are cells in the drupe, each crowned with the withered stigma, internally the exterior half of these drupes next the apex, consists of dry spongy cavities, their lower part next the core or common receptacle is yellow, consisting of a rich-looking, yellow pulp intermixed with strong fibres; here the nut is lodged. *Nut* of each drupe compound, turbinate, exceedingly hard, angular, containing as many cells as there are divisions in the apex of the drupe, each cell is perforated above and below. *Seeds* single, oblong, smooth, adhering lengthways to a small fascicle of strong white fibres, which pass through the perforations of the cell. By far the greatest number of the cells are barren.

*Note.* This plant is much employed to make hedges, for which it answers well, but requires too much room. It grows readily from branches which renders it rare to find the full-grown, ripe fruit. The male is by far the most common, a circumstance merely accidental, for I have seen some old extensive hedges entirely female, which must be owing to their having been originally a female plant or plants nearest to these places. It is the tender white leaves of the flowers, chiefly those of the male, that yield that most delightful fragrance for which they are so universally and deservedly esteemed; for of all the perfumes in the world it must be the richest and most powerful.

The lower yellow pulpy part of the drupes is sometimes eaten by the natives during times of scarcity and famine; the tender white base of the leaves is also eaten raw or boiled during the same melancholy periods. The fusiform roots already mentioned are composed of tough fibres, which basket-makers split and use to tie their work with, they are also so soft and spongy as to serve the natives for corks. The leaves are composed of longitudinal, tough, useful fibres like those of the

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Pine-apple. I have never known this plant cultivated with any other view than for fences, nor do I yet know any other species, or even variety of this genus.

The drawing of the Mellore, or bread fruit of the Nicobar Islands in the third volume of the *Asiatic Researches*, was taken from the ripe fruit brought from those Islands by Colonel Kyd. From this drawing and description there is every reason to think it is the fruit of the female plant of *Pandanus odoratissimus*. The size, from thirty-five to forty feet in height, to which it rises on those Islands, is much greater than I ever saw it on the Coromandel coast, or in Orissa, or Bengal, which, however, is not a sufficient reason to make it a different species.

Extract of a letter from Colonel Hardwicke, dated Mauritius, November 1811. This plant is of extensive use in most parts of the Island, for its leaves, which are employed for the purpose of package bags for the transportation of coffee, sugar, and grain from one place to another, and for exportation. Hedge rows, or avenues are formed of it round plantations, or along the sides of the many roads which intersect them; and the leaves, as fast as they attain maturity are cut till the tree arrives at its full growth, when the production of new leaves being slower, and less useful, younger plants are resorted to, to supply the wants of the planter. The preparation of the leaves for working into matting is simple and short. As soon as gathered, the spines on their edges and dorsal nerve are stripped off, and the leaf divided into slips of the breadth proper for the use they are required for; this operation is performed with the blade of a common straight knife, they are then laid in the sun for a few hours to dry; when required for working into mats the slips are passed under the blade of a knife applied with a moderate pressure to remove all asperities on their surface, which gives them a polish and makes them plain and more convenient to the hands. One negro employed in the foregoing preparation, will supply slips fast enough to keep eight others at work; and each

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negro can finish four, and sometimes five bags in the course of the day. Thus the value of each bag may be computed by the cost, or worth of the labour of nine negroes for one day. Every proprietor of slaves can obtain, by letting them out to daily labour, six Spanish Dollars, or twelve Sicca Rupees per month; the value therefore of the labour of one man for a day may be rated at six annas and one third, thus taking the lowest number made, viz. thirty-six, the cost of each bag will be about one anna and a half. This to me appears a cheaper material than the common gunny bag of Bengal used in the exportation of rice and other grain in Calcutta; it seems also better calculated to repel wet and resist the common injuries of transportation from one place to another. No difficulty would attend the cultivation of this plant in Bengal, where one, or more species of this genus is indigenous. This tree attains here the height of about fifteen feet, the stem at half that height branching into several sub-erect arms terminated by the thick foliage. It flowers in the month of May; the fruit of the kind I here notice is when full grown about five inches in diameter, the seed large, turbinate with an angular apex.

2. P. *foetidus. Roxb.*

*Partial racemes*, or *thyrses* of the male flower simple. *Germs* distinct. *Drupes* spinous pointed, with one-celled nuts.

*Hind.* Keur-kanta.

*Beng.* Kea-kanta.

Found in Bengal, growing wild in uncultivated spots near Calcutta. Flowering time the cold season; the fruit ripens during the hot months of May and June.

I never saw a plant with any thing like a stem, but always in the form of a thick impenetrable bush, of from five to six feet high. *Leaves* as in P. *odoratissimus*, but smaller. *Male inflorescence* as in P. *odoratissimus*, only here the secondary racemes, or thyrses, are simple, being only a thick, ta-

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pering, fleshy receptacle, of about an inch in length, to which the anthers are affixed. *Filaments* very short, with a thick conical base. *Anthers* long, linear, generally waved, with a polliniferous groove on each side. *Female*, the whole of the aggregate female flower as in P. *odoratissimus*. *Germs* most numerous, single and distinct, not collected into fascicles as in the former species, the lower half angular; the upper half tapering into a very sharp, subulate point, on the under side of which there is a lighter coloured, linear, glandular, furrowed elevation, which I take to be the stigma; however immediately below this elevated groove there is a smooth oblong pit or hollow, in the lower part of which is a single cell, with ten ovula, attached to one side of the bottom of the cell. *Fruit* ovula, three-sided, echinated with the most acute prickly points of the drupes, of the size of a small pine apple, when ripe red. *Drupes* wedge-shaped, angular, single, but firmly and closely connected by a pulpy gluten, crowned with the remaining stigma, which is now a sharp thorn. *Nut* conformed to the shape of the drupe, longitudinally fibrous, not very hard, two-celled. *Seed* solitary, in the lower cell, or part of the nut, a septum separating the seed from an upper cell of the nut, which is larger, and replete with soft white pith only.

*Note.* The smell of both male and female flowers is highly offensive, being almost like that of the flowers of *Sterculia foetida*. So far as I know, it is only employed for hedges.

3. P. *amaryllifolius. R.*

Diffuse. *Leaves* linear, tending to be three-nerved, apices rather broad, somewhat spinous-serrulate.

This species came from Amboyna. It has now been fourteen years in the Botanic garden and is by far the smallest I have yet known. It has less of the general habit of the genus, than any other I know, but is furnished abundantly with the characteristic fusiform roots, which issue from the stems and larger branches, and enter the ground, which leaves no doubt with me of its being a *Pandanus*.

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4. P. *furcatus. R.*

*Drupes* of the oblong compound fruit cuneate, crowned with an incurved, polished, sharp, forked spine, nuts one-celled.

Kaida Tsjerria. *Rheed. Mal.* ii. *t.* 8.

A native of Pegu, Chittagong, Malabar, &c.

5. P. *inermis. R.*

Diffuse. *Leaves* ensiform, channelled, unarmed, and polished.

From Amboyna this pretty small species has been introduced into the Botanic garden, where it grows luxuriantly, spreading and leaning over a surface of several feet, and sending forth the usual fusiform roots which enter the soil, as in the other species. The leaves are from two to three feet long, highly polished, and in all our young plants without the smallest sign of a prickle, apices long and slender, triangularly subulate.

## *CYCAS.*

*Male ament* strobile-shaped; *scales* thereof covered on the under side with distinct, sessile, one-celled, two-valved anthers. *Female spadix* with a few solitary, bifarious, alternate, sessile, naked, one-celled germs on the margins, with a single ovulum, attached to the bottom of the cell. *Styles* single. *Drupe* with a woody, one-celled nut. *Embryo* inverse, and amply furnished with perisperm and vitellus.

1. C. *circinalis. Willd.* iv. 844.

*Leaves* pinnate, with long armed petioles. *Leaflets* from fifty to sixty pair, sub-alternate, rather remote, flat, linear-lanceolate, sickle-shaped.

C. *inermis. Lour. Cochin Ch.* 776.

Olus Clappoides. *Rumph. Amb.* i. *t.* 22. the female, and *t.* 23. the male.

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This beautiful, small palm has of late years been introduced from Amboyna into the Company's Botanic garden, where it thrives freely; blossoms in May, and ripens its seed in December and January.

The *trunk* of our young trees, now ten or twelve years in this garden, and some years old when they arrived, is from two to five feet high, and from eighteen to twenty-four inches in circumference, very rough with the swelled scars of the fallen leaves. *Leaves* spreading round the crown of the plant, numerous, viz. sixty or seventy, pinnate, of a smooth, shining, deep green in every part, from three to six feet long. *Leaflets* generally from fifty to sixty on each side, consequently rather remote, in some parts opposite, in others alternate, of a linear-lanceolate, sickle form, acute, almost flat, very smooth and entire, from four to ten inches long, and about half an inch broad. *Petioles* nearly round, smooth, from twelve to twenty-four inches of the base destitute of leaflets, and there generally armed with a row of short sharp spines on each side. *Stipules*, so I call the numerous, pointed, villous, imbricated scales, which are mixed amongst the swelled leaves of the petioles, and closely embrace the peduncle of the strobile. *Male strobile* elevated on a short, thick, firm peduncle, from the crown of the plant, ovate oblong, being at first about nine or ten inches long, but lengthening to nearly double that extent, and continuing throughout about five inches in diameter, imbricated with numerous, diverging scales. After continuing in vigour for nearly two months, its peduncle is forced to one side, to give room for the annual tuft of foliage, which then begins to appear from the centre of the crown of the plant. *Scales* wedge-shaped, obliquely-truncated, and there clothed with much fulvous down. In two of the three male plants now in blossom, a large, erect, subulate point rises from the exterior upper angle of each of the scales; when the strobile first appears they are closely pressed together like the germs in the pine-apple, but as it lengthens by age they become detached from each other, and



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free on all sides. *Corol* none. *Filaments* none. *Anthers* perfectly distinct, numerous, entirely covering the under surface of the scales of the strobile, one-celled, two-valved, opening round the apex for the discharge of the pollen. *Pistil* nothing like one to be found.

FEMALE. In May 1804 a female plant blossomed at the same time the above-mentioned three male trees were in flower. The female tree is rather higher and more robust than the largest of the males, and its inflorescence differs but little from that of *revoluta*, viz. a strobiliform cone crowning the stem surrounded with a circle of leaves exactly like those of the male. This strobile is composed of many exterior, barren, villous, cuspidate scales called stipules in the male, immediately within are the downy, compressed, clavate, spatulate, two-edged spadices; on the sides, about the middle of each, the naked, round, smooth, one-celled, one-sided germs are immersed, generally two on each side, crowned with a minute style, and a perforated, callous, margined stigma. Beyond the germs the spadix becomes incurved, and of a dilated, rhomb shape, with the exterior margins cut into several subulate, straight segments, the middle one being much longer, larger, and more villous that the rest. *Drupe* oval, of the size of a small pullet's egg, somewhat flattened, smooth till they become wrinkled by drying; when ripe yellow, one-celled. *Nut* conform to the drupe, ligneous, one-celled, lined on the inside with much brown, spongy matter, particularly about the base.

2. C. *revoluta. Willd.* iv. 844.

*Leaves* pinnate, with short, armed petioles; *leaflets* approximate, from one to two hundred pairs, linear, with a spinous point, and revolute margins.

C. *revoluta. Smith* in *Trans. of Linn. Soc.* vi. 312. *t.* 29, 30; excellent for the female plant.

The female of this charming species, is very common in gardens about Calcutta, where it grows in about the space

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of thirty years, to the height of ten, or twelve feet; I mean the trunk, every one of which produces offsets in abundance, by which the plant is readily multiplied. But I see no reason to think it can ever be made a useful article of diet. I have never found the male tree.

3. C. *sphaerica. Roxb.*

*Leaves* pinnate, sides of the petioles armed with a short spine; *leaflets* from eighty to one hundred pair, sub-alternate, linear, spinous-pointed. *Scales* of the male strobile with long, curved, subulate points. *Drupes* spherical.

This additional, charming species of *Cycas* was with C. *circinalis*, introduced into the Botanic garden from the Moluccas in 1798-9. In 1806 and the following year several of both male and female plants, blossomed in the month of May. The female of one of those ripened its seeds in January and February, and now, September, those seeds are beginning to vegetate, after having been in the ground about six months. The plants of this species differ in habit but little from *circinalis*; I will therefore only note wherein they differ from each other.

*Trunk* of both the male and female trees, are hitherto, in this species from thirty-four to fifty-four inches in circumference; it is therefore thicker than *circinalis*, in other respects they are alike. *Leaves*, in this species they are smaller, the petioles longer and more armed, and the leaflets more numerous, viz. from eighty to one hundred, sub-alternate pairs. In *circinalis* they are from fifty to sixty, narrower, and straighter. MALE. In this the strobile, or cone, has the same appearance of a pine-apple, as it has also in the other, but the scales taper from the middle, into very long, incurved, subulate points; whereas in *circinalis* they are almost truncated, with a point more or less long, rising nearly at right angles, from the exterior upper angle. *Anthers* the same in both. About the time the cone, or flower, begins to decay, it is, as in *circinalis* forced to one side by the annual tuft of foliage bursting from the crown of the



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plant. FEMALE. The spadices are numerous, and with generally three pistils on each side, beyond these they rise in a curve, and immediately expand into an ovate-triangular shape, with long, subulate points, and the whole margins deeply and acutely dentate; every part, except the pistil, is clothed with a thick coat of ferruginous down, which is easily rubbed off. In C. *circinalis* these form a large globular crown in the centre of the last year's foliage, and are surrounded with numerous, barren, cuspidate scales, or bractes. *Germs* solitary, round, partly immersed in the edge of the spadix, one-celled, ovula solitary, amply attached to the bottom of the cell. *Style* short, straight. *Stigma* simple, perforated. *Drupes* nearly round, a little compressed, smooth, about the size of a pigeon's egg, tipped with the permanent stigma, when ripe of a dull orange colour. *Pulp* somewhat mealy, sweet, yellow, but the smell is uncommonly disagreeable. *Nut* solitary, conform to the drupes, ligneous, a little pointed under the stigma, with a small elevation running from thence to the base on each side, which marks the place where it bursts, when the seeds begins to vegetate, consequently it is two-valved. *Seed* single, of the size and shape of the cavity of the nut which it completely fills. *Integuments* three, the exterior one deep brown, thick, and firm, adhering to the inside of the shell, particularly at the bottom, the middle one thin, of a light brown, membranaceous, and the inner one a very thin white membrane. *Perisperm* conform to the seed, of a pale yellowish white, fleshy; in its apex, under the style, is a transversely oval pit, the bottom thereof marked with five or six brown dots, corresponding with as many oblong cavities immediately under them, which penetrate, in unimpregnated seeds about one-tenth their diameter, these are alike in shape and size, but in such as have been impregnated, one of these cells penetrates more than half way down, through its centre, and contains a wedge-shaped body, which I call the *vitellus*, suspended, or attached to the mouth of the cell, by a long, white, folded, umbilical cord. A vertical section of this body

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exposes what I call the true *embryo* lodged a little above its middle, and composed of two unequal lobes, resembling cotyledons pointing to the base of the vitellus; from the upper pointed end of this bilobate body the radicle issues, when vegetation commences, passing out through the mouth of the cell, and the apex of the nut now open; from the middle of the upper side of the radicle bursts forth, in due time, the *plumula*, in form of a small scale, and from its centre other scales continue to spring; the fourth, or fifth, begins to take the form of the pinnate leaf of the full-grown plant.

From the fresh wounded parts of all the three species of *Cycas* known to me, viz. *circinalis*, *revoluta* and this, there is discharged a quantity of clear, insipid mucilage, which soon hardens into firm, transparent gum, like *tragacanth*, but clearer; my experience however does not lead me to think that any one of the three yields sago, or even a substitute for it. I dare not venture to quote *Todda panna* of *Rheede's Malabaricus*, iii. *t.* 13—21, for this, because it has already been quoted by *Linnæus*, &c. for C. *circinalis*, yet I think *Rheede's* figures and description, agree better with this plant than with what I have already described, and figured under that name. For more information, consult *Rumph's Herbarium Amboinense*, i. *p.* 86—92, and the figures there quoted.

## *NAJAS.*

*Male calyx* cylindric, bifid. *Corol* four-cleft. *Filaments* none. *Female calyx* none. *Corol* none. *Pistil* none. *Capsule* one-celled.

*N. dichotoma. R.*

Dichotomous. *Leaves* tern, filiform. *Seed* solitary, oval, smooth. It grows in deep pools of sweet water in Bengal.

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## DIOECIA DIANDRIA.

*VALLISNERIA. Schreb. gen. N.* 1491.

*Male spathe* entire, or two-parted. *Spadix* simple. *Corol* three-petalled, or three-parted. *Female spathe* as in the male, one-flowered. *Perianth* three-parted. *Corol* three-petalled. *Styles* three or three-parted. *Capsule* one-celled, many-seeded.

1. V. *spiraloides. R.*

Stemless. *Leaves* radical ensiform, serrulate. *Female* on a spiral scape, with a three-toothed spathe; no corol, nor nectary.

A native of Coromandel.

2. V. *alternifolia. R.*

Ramous. *Leaves* linear, alternate, and opposite at the origin of the branches.

*Hind.* Ganj.

*Beng.* Rusna-jhanj.

Found in ponds of fresh water near Calcutta, in high perpection during the latter part of the rainy season.

*Root* stole-bearing, affixed in the ground, fibrous. *Stems* filiform, ascending through the water, and of various lengths, but sufficient, when the inundations are not too rapid, to raise the alternate ramifications even with the surface of the water. *Leaves* alternate, except at the ramifications, and there generally opposite; those of the stem remote; of the flower bearing branches approximate; stem-clasping, sword-shaped, serrate, from two to four inches long. So far the male and female plants agree. MALE. *Calyx common, spathes* axillary, paired, sessile, composed of two valves parting when the corollets are ready to be disengaged. *Common spadix* as in the genus, surrounded with innumerable pedicelled corollets. *Corol* five-petalled, unequal, com-

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pletely reflexed. *Filaments* two, clubbed. FEMALE. *Flowers* axillary, sessile, paired. *Spathe* as in the genus. *Perianth* (or *corol*) three-leaved, spreading, orbicular, concave and elevated on a most slender pedicel. *Corol* no other than the last mentioned. *Germ* oblong, tapering in the above mentioned slender pedicel or style; *stigma* six-leaved; *leaflets* revolute, appearing like the corol sitting close to the calyx. *Capsule* as in the genus.

*Note.* The small corollets when separated from the spadix, swim upon the tips of the reflected petals, over the surface of the water, till entangled by the large corol-like stigmas of the female flowers.

3. V. *verticillata. R.*

Ramous. *Leaves* verticelled. *Male spathe* one-flowered.

Hottonia *serrata. Willd.* i. 329.

Serpicula *verticillata. Suppl. p.* 416. *R. Corom. pl.* ii. *No.* 164.

*Teling.* Poo natsoo.

Grows in clear, standing, sweet water. Flowers during the cold season, and consists of simple, filiform roots, and a number of fine, filiform, jointed shoots, or stems; some creeping, some floating below the surface of the water, branches solitary, axillary.

*Leaves* sessile, verticelled, three to six-fold, oblong-lanceolate, from one eighth to half an inch long. MALE FLOWERS axillary, sessile, from one to four in the verticel, much smaller than the female. *Calyx, spathe* one-flowered, sub-globular, murexed, bursting irregularly. *Perianth* three-leaved; *leaflets* obovate, reflexed. *Corol* three-petalled; *petals* wedge-formed, reflexed. *Filaments* three, short, ascending. *Anthers* very large, two-lobed, opening with an elastic jerk, pollen white, very large grained. FEMALE FLOWERS on distinct plants, axillary, generally solitary, though sometimes there are two from the same verticel. *Spathe, perianth,* and *corol,* as in the genus; no nectary. *Germ* sessile, subulate,

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ending in the long, sub-erect receptacle of the flower which elevates it above the water while expanded. *Stigmas* three, lanceolate. The *capsule* has the appearance of a silique, sometimes murexed, one-celled. *Seeds* from three to five, oblong, pointed at each end, lodged as in the leguminous plants; their attachments I could not discover.

*Note.* When the male flowers are ready to expand, the murexed spathe bursts, the flowers are then quickly detached, and swim remote from the parent plants, on the surface of the water, in search of the female flowers, resting on the extremites of the reflexed leaflets of the perianth, and petals of the corol; what a wonderful economy!

The Bruhmapoor sugar refiners use this herb, while moist, to cover the surface of their sugars, as clay is used in the West India Islands, and in two or three days the operation is finished exceedingly well.

4. V. *octandra. Willd.* iv. 651. *Corom. pl.* ii. 165. 475.

Stemless. *Leaves* radical, ensiform. *Scape* straight. *Male flowers* octandrous.

Saivala. *Asiat. Res.* iv. 275.

*Hind.* and *Beng.* Shyala, Semar, also Halla.

A grass-like plant, growing in standing, shallow, sweet water.

*Root* fibrous, annual. *Leaves* radical, linear, tapering to a fine point, serrulate, smooth; from nine to thirty-six inches long, and half an inch or less broad. MALE FLOWERS. *Peduncles* or rather *scapes* axillary, straight, a little compressed, the length of the leaves, or more, so as to raise the flowers above the surface of the water. *Spathe* one-leaved, sub-cylindric, somewhat diaphanous, open at top for the unexpanded flowers to pass through. *Flowers* numerous, in succession, white, pretty large, pedicelled; *pedicels* lengthening when the flowers are ready to expand, so as to elevate them just above the mouth of the spathe. *Perianth proper* three-leaved; *leaflets* lanceolate. *Corol* three-petalled; *petals* line-

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ar, recurved, more than twice the length of the calyx. *Filaments* eight, of unequal length, erect, shorter than the petals. *Anthers* linear. *Germ* abortive, three-sided. *Styles* three. FEMALE FLOWERS on a separate plant. *Scape* shorter, and thicker than in the male. *Spathe* as in the male, one-flowered. *Flowers* white, elevated above the germ, and above the mouth of the spathe by a very long receptacle, style, or pedicel, which makes up for the shortness of the scape, and brings the flowers nearly of a height with the tops of the leaves. *Perianth* three-parted. *Corol* as in the male, only the petals are here filiform. *Germ* cylindric, obsoletely three-sided, sessile in the bottom of the spathe, ending in the above mentioned flower-elevating receptacle. *Style* three-cleft to near the base; *divisions* filiform, white. *Capsule* as in the genus.

They are all found in lakes and in stagnant pools of sweet water, and as in V. *spiralis*, the male flowers, when ready to expand, detach themselves from the plant, and are borne, as the wind directs over the surface of the water, resting on the tips of their reflected petals in search of the female flowers.

*SALIX. Schreb. gen. N.* 1493.

MALE. *Ament* cylindric. *Calyx* scaly. *Corol* none, but a nectariferous gland in the centre. FEMALE. *Calyx* the scales of the ament. *Corol* none. *Style* two-cleft. *Capsule* one-celled, two-valved. *Seeds* downy.

1. S. *tetrasperma. Willd.* iv. 657. *Corom. pl.* 1. *N.* 97.

Arboreous. *Leaves* lanceolar, serrulate, acuminate, smooth. *Stamina* from six to eight. *Capsule* four-seeded.

*Sans.* Burun.

*Beng.* Pani-juma.

*Hind.* Baishee.

This is the only species of *Salix* I have yet found in India. It is a middle-sized tree, a native of the banks of rivulets



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and moist places among the Circar mountains. Flowering time the cold season.

*Trunk* erect but short, as thick as a man's body. *Head* large, very ramous. *Branchlets* twiggy. *Leaves* alternate, short-petioled, lanceolar, fine-pointed, most minutely serrate, smooth above, whitish below, from two to four inches long. MALE. *Ament* filiform, its peduncle often leaf-bearing, issuing from the dry, smooth, brown involucre-like scales of the bud. *Scales* small, cup-formed, with a long depending tongue-like lip, giving to the whole the appearance of a slipper. *Filaments* from six to eight, retrofracted, three or four times longer than the tongue of the perianth. *Anthers* twin, singly orbicular and grooved. FEMALE. *Aments* shorter than in the male; *perianth* the same. *Germ* long-pedicelled. *Style* as long as the capsule. *Stigmas* two, spreading. *Capsule* cordate, opening from the apex, one-celled, four-seeded. *Seeds* oblong, involved in much fine white cotton; which does not adhere to them, but is inserted with them into the bottom of the capsule.

2. S. *Babylonica. Willd.* iv. 671.

Arboreous. *Branchlets* pendulous. *Leaves* linear-lanceolate, serrate, smooth, glaucous underneath. *Male flowers* diandrous.

A native of the middle parts of Asia. In Bengal it blossoms during the hot season.

The scales of the ament in the male, form something like a one-lipped hairy cup which is not more than one-fourth the length of the filaments. On each side, without and within, the insertion of the filaments, is an oblong, yellow, smooth gland, rather shorter than the scales.

## DIOECIA TRIANDRIA.

*OSYRIS. Schreb. gen. N.* 1497.

*Male calyx* trifid. *Corol* none. *Female calyx* as in the

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male. *Corol* none. *Germ* superior, one-celled, one-seeded; *attachment* lateral; *stigma* sub-rotund. *Capsule* one-celled, two-valved, one-seeded. *Embryo* obliquely inverse, and furnished with a perisperm.

O. *peltata. R.*

Arboreous. *Leaves* peltate, ovate-cordate, entire.

A native of the Circar mountains; and of various other mountainous countries. The male tree of *Ricinus Mappa, Linn.* is so much like this, as scarcely to be distinguished; the female of that I have not yet seen.

*Leaves* alternate, petioled, peltate, cordate, pointed, entire, three-nerved, pretty smooth above, hairy underneath, from six to nine inches long, and about four or five inches broad. *Petioles* round, smooth, nearly as long as the leaves. *Stipules* obliquely oblong, caducous. MALE. *Panicles* or *compound racemes* thin, axillary, erect, interrupted. *Bractes* broad-cordate, notched, downy, many-flowered. *Flowers* exceedingly minute. *Calyx* three-parted; *divisions* ovate, crenate, downy. *Corol* none. *Filaments* three, as long as the calyx. *Anthers* peltate, four-sided, four-celled; *cells* covered with lids. FEMALE. *Racemes* axillary, simple, erect. *Bractes* broad-lanceolate, notched, pointed, from one to two-flowered. *Calyx* as in the male. *Corol* none. *Germ* superior, globular, covered with glutinous farina, one-celled, containing a single ovulum attached to the inside of the cell a little below the stigma. *Style* none. *Stigma* lateral, large, scabrous. *Capsule* round, of the size of a pea, fleshy, covered with clammy, waxy grains, with a groove on each side from the base to the vertex, one-celled, two-valved. *Seed* single, spherical, attached as in the germ. *Integuments* three; the *exterior* one smooth, shining, of a blackish brown; the *middle* one nuciform, black, thick, hard, and very rough on the outside, between it and the exterior tunic is a quantity of soft whitish pulp; the *inner* one pure white, and very thin. *Perisperm* conform to the seed, white, fleshy. *Embryo* oblique-



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ly inverse, pure white. *Cotyledons* round-cordate, three-nerved. *Plumula* minute. *Radicle* oblong, pointing obliquely up between the vertex and the stigma.

All the young parts of this plant are covered with more or less of soft, resinous, adhesive matter, which smells strongly of turpentine.

*EXCOECARIA. Schreb. gen. N.* 1498.

MALE. *Ament* cylindric, imbricated with one-flowered scales. *Corol* five-petalled. FEMALE. *Ament* scaly. *Perianth* three-leaved. *Corol* none. *Styles* three. *Capsule* tricoccous.

1. E. *Agallocha. Willd.* iv. 864.

*Leaves* alternate, ovate-cordate, serrulate, smooth. *Ament* axillary.

Arbor excæcans. *Rumph. Amb.* ii. *t.* 79, 80.

Geria of the inhabitants of the Delta of the Ganges, where it is very common, growing to the size of a small, crooked, rather ill-looking, stunted tree.

*Leaves* alternate, about the extremities of the branchlets, petioled, ovate and ovate-cordate, smooth on both sides, remotely and slightly serrate, pointed, with two glands at the base circumscribed with a purple border, about two inches long. *Petioles* about an inch long, smooth, channelled. *Stipules* small, fine-pointed. *Male calyx. Aments* axillary, often crowded, cylindric, while young imbricated with fine spiral rows of one-flowered, reniform scales, which lengthen by age, when the flowers become distinct, and at a small distance from each other. *Corol* no other than five, small squamæ round the base of the filaments. *Filaments* three. *Anthers* of two large lobes. *Female calyx. Aments* solitary, axillary, the lower half containing from two to four, or even six, rather remote, one-flowered scales, the remaining part imbricated with numerous, small, neuter scales. *Perianth*, or corol

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of three, cordate, pointed leaflets. *Stamens* none. *Germ* superior, three-lobed. *Styles* three, recurved. *Stigmas* simple. *Capsule* tricoccous.

The wood-cutters of the Sunderbunds, who are the people best acquainted with the nature of this tree, report the pale, white, milky juice thereof to be highly acrid and very dangerous, producing inflammation and ulceration. The only use made of the tree, so far as I can learn, is for charcoal and firewood. Agallochum of any sort is, I believe, never found in this tree.

2. E. *integrifolia. R.*

*Leaves* alternate, petioled, oblong, entire, polished. *Male aments* axillary, with many-flowered scales.

A native of the Moluccas.

*STILAGO. Schreb. gen. N.* 1381.

MALE. *Calyx* three-lobed. *Corol* none. *Anthers* twin. FEMALE. *Calyx* as in the male. *Corol* none. *Germ* superior, one-celled, two-seeded; *attachment* superior. *Drupe* one-seeded. *Embryo* inverse and furnished with a perisperm.

1. S. *tomentosa. R.*

Shrubby, tomentose. *Leaves* acuminate. *Stipules* subulate. *Spikes* cylindric, amentaceous; *male flowers* triandrous.

Tenguree the vernacular name in Silhet, where this shrub is found indigenous, flowering in May and June, and ripening its fruit in September.

*Trunk* scarcely any, but many sub-erect branches, dividing into numerous, very tomentose, erect twigs; whole height three or four feet. *Leaves* alternate, sub-sessile, oblong, entire, very finely acuminate, hairy on both sides, from four to twelve inches long, by from two to five broad. *Stipules* subulate, hairy, about an inch long. *Male spikes* terminal, filiform, erect, generally paired, amentaceous, half the length

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of the leaves, very downy. *Calyx* four-lobed, one of the lobes smaller; all downy and ciliate. *Corol* none. *Nectary* of three circular, concave, smooth lobes, into which the three filaments are inserted. *Filaments* three, much longer than the calyx. *Anthers* of two, large, distinct lobes, each with a polliniferous pit in the apex. *Female spikes* axillary, and terminal, one, two, or three together, long, slender. *Flowers* numerous, minute, sessile. *Bractes* minute, one under each flower. *Calyx*, from three to four-lobed, downy. *Corol* none. *Nectary* saucer-shaped, entire, embracing the base of the germ. *Germ* ovate, hairy above the nectary, one-celled, two ovula in each, attached to the top of the cell. *Style* scarcely any. *Stigma* of about three emarginate divisions. *Drupes* obliquely oblong, succulent, of the size of a pea, one-celled. *Nut* conform to the drupe, hard, variously sulcated both within and without, one-celled, two-valved. *Seed* solitary, oval. *Perisperm* conform to the seed. *Embryo* inverse; described and figured by *Gærtner. vol.* i. *p.* 188. *t.* 39.

2. S. *Bunius. Willd.* iv. 714.

Arboreous. *Leaves* alternate, entire, lanceolate-oblong, polished. *Spikes* axillary and terminal; *male flowers* triandrous, with an abortive column in the centre.

*Bunius* sativus. *Rumph. Amb.* iii. *t.* 131, the large branch.

Noeli-tali. *Rheed. Mal.* iv. *t.* 56. which I have already quoted for *Antidesma alexiteria;* they are the same.

The seeds were received from Nepal about seven years ago; now, 1809, the trees raised from them, are from twenty to thirty feet high, very ramous, with a smooth barked, stout trunk. Flowering time the month of March; the fruit ripens in September.

*Leaves* alternate, short-petioled, oblong, and lanceolate-oblong, but rather narrower towards the base, entire, smooth, of a shining green on both sides. *Stipules* ovate-cordate, acuminate, caducous. *Spikes* in the female solitary, and terminal; in the male axillary, and from one to three or even more

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together, sub-cylindric. *Flowers* numerous, sessile, or in part immersed in the substance of the spikes, small, of a greenish yellow. MALE. *Proper perianth* urceolate, with the mouth obscurely three-lobed. *Corol* none. *Filaments* three, much longer than the calyx. *Anthers* two-lobed, bearing the pollen in pits on their apices. *Pistil*, no germ, but an inserted, truncated, pyramidical body occupies its place; in its base the filaments are inserted alternate with as many small glands. FEMALE FLOWERS on a distinct tree. *Calyx* as in the male but smaller. *Stamens* none. *Stigmas* three. *Drupe* of the size and shape of a large Berberry, smooth, succulent, sub-acid, when ripe of a deep red inclining to black. *Nut* compressed, rugose, one-seeded.

The tree is of a quick growth, very handsome and particularly beautiful when loaded with the numerous bunches of ripe, shining, deep red fruit, which are sub-acid, and palatable.

3. S. *diandra. Willd.* iv. 714. *R. Corom. pl.* ii. *N.* 166.

*Leaves* oblong, smooth. *Stipules* ensiform. *Spikes* axillary, and terminal. *Male flowers* diandrous.

*Teling.* Pella-gomoodoo.

A tree, a native of the mountainous parts of the Circars.

Flowers in June, bearing male flowers on one tree, and female ones on another.

*Leaves* alternate, short-petioled, nearly bifarious, oval or oblong, entire, smooth; from two to four inches long, and from one to two broad. *Stipules* narrow, lanceolate. *Spikes* filiform, terminal, many-flowered. *Bractes* minute, one-flowered. *Flowers* very small, approximate. MALE. *Calyx* cup-formed, obtusely four-toothed. *Corol* none. *Filaments* two, four times longer than the calyx. *Anthers* twin; singly oval. FEMALE. *Calyx* inferior, closely embracing three-fourths of the germ, from four to five-toothed. *Corol* none. *Nectary*, a yellow fleshy ring surrounding the base of the germ. *Germ* superior, obliquely ovate. *Styles* two, spreading, one of them

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always two-cleft. *Stigmas* simple. *Drupe* minute, succulent, one-celled. *Nut* one-celled, very small.

The berries are eaten by the natives when ripe. The wood serves for various uses.

4. S. *lanceolaria. R.*

Shrubby, smooth. *Leaves* lanceolar. *Stipules* ensiform. *Spikes* terminal, filiform; *male flowers* diandrous.

A very bushy, large shrub, void of all sorts of pubescence; a native of Chittagong. In the Botanic garden it blossoms during the rainy season.

*CATURUS. Schreb. gen. N.* 1449.

*Male calyx* none. *Corol* trifid. *Female calyx* three or four-parted. *Corol* none. *Styles* three. *Capsule* tricoccous.

C. *spiciflorus. Willd.* iv. 714.

Shrubby. *Leaves* long-petioled, cordate, serrate. *Spikes* pendulous, longer than the leaves.

Cauda-felis agrestis. *Rumph. Amb.* iv. *t.* 37. *f.* 1. the male, and *f.* 2. the female.

Acalypha hispida. *Burm. Fl. Ind. t.* 61. *f.* 1. would be a tolerable representation of the female, if the spikes were longer, and pendulous.

Exclude Watta-tali, *Rheed. Mal.* v. *t.* 32, which is more like my *Rottlera dicocca*, and totally different from a *Caturus*.

## DIOECIA TETRANDRIA.

*TROPHIS. Schreb. gen. N.* 1502.

MALE. *Ament* imbricated, globular. *Calyx* four-leaved or none. FEMALE. *Calyx* four-leaved or none. *Germ* superior, one-celled, one-seeded; *attachment* superior. *Berry* one-seeded. *Embryo* inverse, curved, no perisperm.

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1. T. *aspera. Willd.* iv. *p.* 793.

Arboreous. *Leaves* oblong, unequally serrate, scabrous.

*Sans.* Sakhotuka.

*Hind.* and *Beng.* Syora, or Sheora.

Tinda-parua. *Rheed. Mal.* i. *t.* 48.

Streblus asper. *Lourier. Cochin Ch.* 734. and 754.

Achymus pallens. *Solander*, in the *Banksian Herbarium.*

*Teling.* Barinka.

Is generally shrubby, though sometimes it grows to be an ill-looking, scraggy, crooked small tree; is common every where in India. Flowers in the cold season.

*Leaves* alternate, short-petioled, oblong, unequally serrate, or crenulate, hard, very rough; about two inches long by one broad. MALE. *Ament* axillary, globular, short-peduncled, one, or two. *Flowers* minute, sessile, greenish-yellow, from ten to fourteen from the small globular spike, or ament. *Calyx* or *corol* four-leaved; *leaflets* orbicular, spreading. *Female flowers* on a separate plant. *Peduncles* from one to five, axillary, short, one-flowered. *Calyx* or *corol* as in the male, permanent. *Germ* ovate, one-celled, with one ovulum attached to the top of the cell a little on one side of the origin of the short *style*, which soon divides into two filiform, rough, tapering stigmas. *Berry* of the size of a pea, nearly round, smooth; when ripe yellow, crowned with the remaining style on one side of the vertex, one-celled. *Seed* single, round. *Integuments* two, both thin, but uncommonly distinct. *Perisperm* none. *Embryo* conform to the seed, curved, greenish. *Cotyledons* two, very unequal, the largest being nineteen twentieths of the whole embryo, on one side divided half way through into two lobes. The male cotyledon is hid between the lobes of the larger one. *Plumula* two-lobed. *Radicle* sub-cylindric, curved, superior, with its apex immediately under the remaining style.

The leaves of this plant are employed by the natives to polish ivory; the wood is used only for fuel. The berries are greedily eaten by birds.



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2. T. *spinosa. R.*

Arboreous, thorny. *Leaves* oblong-lanceolate, towards the apex grossly serrate, smooth. *Female calyx* twice the length of the berry.

*Teling.* Sukalee.

This seems a new species uniting *Trophis* and *Taxus* in itself. It is a rare plant, a native of the tops of mountains, where it becomes a small tree. It flowers during the cold season.

*Trunk* crooked. *Branches* very irregular. *Thorns* very strong, straight, sharp, scattered over every part of the tree, often leaf and flower-bearing. *Leaves* scattered, very short-petioled, oblong, pointed, with the outer half grossly serrate, waved, smooth, two and a half inches long by one broad. *Stipules* acute. MALE. *Aments*, &c. as in the former species, excepting an imbricated involucre. FEMALE. *Peduncles* axillary, single, short, one-flowered, erect. *Calyx* four; *leaflets* at the base cordate, from thence tapering to a long narrow point, waved, large, permanent, increasing with the fruit. *Germ* superior, resting in an obliquely cup, or helmet-like receptacle, the upper and black part of which has a perforation for the passage of the style, which is two-cleft, &c. as in T. *aspera*. *Berry* obliquely oval, size of a cherry, half immersed in the increased receptacle, pulpy, one-seeded. The female flowers are eaten in curries by the natives.

*BATIS. Schreb. gen. N.* 1503.

MALE. *Ament* roundish. *Calyx* none. *Corol* none. *Berry* compound.

1. B. *spinosa. R.*

Sub-arboreous, with long scandent thorny branches. *Leaves* oblong, entire, smooth.

Trophis *spinosa. Willd.* iv. *p.* 735.

Cudranus. *Rumph. Amb.* v. *t.* 15. *f.* 1. or 2. seems the female plant of this.

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*Teling.* Koriti.

A scarce, very large, woody, straggling, or climbing shrub, or small tree, with very long, drooping, slender branches; every axill is armed with a remarkably long, sharp, somewhat recurved thorn. *Leaves* scattered, rather remote, short-petioled, obovate, or oval, obtuse, entire, reflexed at the margins, hard, smooth, shining; from two to three inches long by one and a half broad. MALE. *Aments* peduncled, scattered or axillary. FEMALE. *Flowers* on a separate plant. *Ament* or receptacle peduncled, small, fleshy above the base of the thorns. *Flowers* aggregate. *Calyx* none. *Corol* none. *Germs* about ten or twelve, oval, immersed in the pulp of the ament, or receptacle. *Style* single, crooked, long, downy. *Berry*, seldom more than one comes to perfection, globular, of the size of a large pea, one-seeded, as it comes to maturity the ament, or receptacle is obliterated, and appears a single, one-seeded berry. This plant is very fit for hedges, and fuel, I know no other uses it is put to.

2. B. *fruticosa. R.*

Shrubby, armed. *Leaves* alternate, oblong, entire, acuminate. *Berries* dry, conglomerate.

A native of Chittagong. It flowers in October and November, and the seed ripens in April and May.

*VISCUM. Schreb. gen. N.* 1504.

*Male calyx* four-parted. *Corol* none. *Filaments* none. *Anthers* growing to the calyx. *Female calyx* four-leaved, above. *Corol* none. *Style* none. *Berry* one-seeded.

1. V. *monoicum. R.*

Monoicous, shrubby, parasitic. *Leaves* opposite, lanceolar, from three to five-nerved. *Flowers* axillary, three-fold, sessile, male and female ones mixed on the same plant. *Berry* long.

Found by Mr. Crommelin on trees growing in the Delta



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of the Ganges, in blossom about the beginning of the hot season.

*Branches* numerous, woody, opposite and dichotomous, jointed, round and smooth. *Leaves* opposite, sub-sessile, lanceolar, somewhat pointed, entire, fleshy, from three to five-nerved; they are often a little falcate; about two inches long. *Flowers* axillary, and at the divisions of the branchlets, in sessile fascicles of generally three, the centre one is generally male, and the lateral two female. *Bractes*, a transversely oblong, two-pointed, permanent, cup or common calyx in which the flowers sit. *Berry* long.

2. V. *verticillatum. Willd.* iv. 741.

Shrubby, with sub-verticelled branches. *Leaves* oblong, three-nerved. *Flowers* axillary, from three to seven together, sessile.

*Teling.* Sundra-woodiniki.

On trees on the coast of Coromandel. It flowers in the hot season.

3. V. *opuntioides. Willd.* 740.

A very ramous, parastical shrub. *Branches* prolifero us, compressed, leafless.

A native of Coromandel.

4. V. *confertum. R.*

Monoicous, parasitic, very ramous, smooth. *Leaves* opposite, sub-sessile, lanceolar, from three to five-nerved. *Flowers* sessile, crowded into little axillary heaps. *Berries* oblong.

Grows on mango trees in the Silhet district.

## *MONETIA.*

*Male calyx* four-toothed. *Corol* four-petalled. *Female calyx* and *corol* as in the male. *Style* none. *Stigma* glandular. *Berry* one or two-seeded.

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M. *barleriodes. L'Herit. Strip. Nov.* i. *t.* 1. *Willd.* i. 669.

Shrubby. *Spines* quatern. *Leaves* opposite, spinous-pointed.

*Beng.* Trikanta-*juti.*

*Hind.* Kanta-goor-kamai.

*Teling.* Tella-upee.

This is one of the most common shrubs on every part of the coast of Coromandel, it grows freely in all situations, and is in flower and fruit most part of the year. *Stem* scarcely any, but *branches* innumerable, opposite, spreading in all directions, forming a close, impenetrable bush, something like the Furze; *young branches* four-sided. *Thorns* axillary, four-fold, spreading, very sharp, from one to two inches long. *Leaves* opposite, short-petioled, reflexed, oval, acute. MALE FLOWERS axillary, sessile, single or crowded, and also interrupted spikes, small, yellow. *Bractes* minute, acute, pressing the calyx. *Calyx* four-toothed; teeth obtuse. *Petals* four, lanceolate, recurved. *Filaments* shorter than the petals. *Anthers* oval, incumbent. *Pistil* a conical gland in its place. FEMALE axillary, solitary, sessile, between the two thorns. *Calyx* and *corol* as in the male. *Filaments* four, small. *Anthers* broad-sagittate, sterile. *Germ* superior, globular. *Style* none. *Stigma* large, glandular. *Berry* globular, of the size of a pea, when ripe white, succulent. *Seeds* two. *Berries* eaten by men and birds.

*MYRICA. Schreb. gen. N.* 1510.

MALE. *Ament* with crescent-shaped scales. *Corol* none. FEMALE. *Ament* oblong; *scales* as in the male. *Corol* none. *Styles* two. *Drupe* one-seeded. *Embryo* inverse, without perisperm.

M. *integrifolia. R.*

*Leaves* lanceolar, entire, smooth; *scales* of the female aments reniform-cordate, one or two-flowered. *Drupes* oval, granulated.

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Sophee, the vernacular name in Silhet, where it is indigenous, and grows to the size of a large bush. Flowering time December and January, and the fruits ripen in May, when they are pickled by the natives, and used as a condiment. In its raw state, this fruit though inviting to the eye, is too sour to be relished. *Branchlets* very ramous; the tender shoots considerably hairy. *Leaves* permanent, alternate, approximate, round, every part of the apices of the branchlets short-petioled, lanceolar, entire and perfectly smooth; from three to six inches long, by about one broad. *Stipules* none. FEMALE. *Aments* axillary, generally cylindric, rarely more than an inch long, considerably villous, many-flowered. *Scales* reniform-cordate, somewhat acuminate, sprinkled on the back with small yellow, shining grains, one or two-flowered, intermixed with many small fleshy scales resembling a perianth. *Germ* minute, ovate, one-celled, containing a single ovulum attached to the cell. *Styles* two, or two-cleft. *Drupe* oval, the size of a prune. *Nut* oblong, thick and very hard, a little flattened, the two edges rather extended and somewhat sharp, densely clothed with an immense quantity of fine white hair in pencilliform tufts. The *pulp* consists of innumerable, closely impacted, but distinct, clavate, succulent, yellow bodies. *Seed* ovate-oblong. *Integument* single, membranaceous. *Perisperm* none. *Embryo* inverse. *Cotyledons* conform to the seed, amygdaline. *Radicle* superior.

### *NAGEIA, Gært.*

*Male calyx* from four to five-leaved. *Corol* none. *Female calyx* from three to five-leaved. *Corol* none. *Germ* three-celled; *cells* two-seeded; *attachment* superior *(axipendula.) Styles* two or three. *Drupe* one-seeded. *Embryo* inverse, and furnished with a perisperm.

N. *Putranjiva. R.*

*Leaves* alternate, narrow-oblong, acutely serrulate. *Flowers*

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triandrous; *filaments* more or less coalesced. *Drupes* ovate.

*Pootrunjeeva* the Sanscrit name. *Pootra* signifies a son and *jeeva* life. Dr. Berry of Madras informs me, the nuts are known, and sold in the bazars at that place by the very same appellation; and observes that they are strung by parents, and put round the necks of their children, to preserve them in health.

Pongolam. *Rheed. Mal.* vii. *t.* 59.

Pootrunjeeva, Pitanjya, Pootranjubkum, Pitanja, are some of its numerous Asiatic synonyms.

*Teling.* Kudra-juvi.

In the carpology it is nearly allied to Gærtner's *Nageia*, i. 191. *t.* 39.

A native of the various mountainous countries of Coromandel and Hindoosthan, where it grows to be a large timber tree with an erect straight trunk; and a large spreading shady head, composed of innumerable expanding branches with bifarious branchlets. Flowering time March and April, and the fruit ripens in January. The wood is white, close-grained and very hard.

*Leaves* alternate, short-petioled, bifarious, lanceolate-oblong, acutely serrulate, rather obtuse, with the base generally oblique, smooth, shining, waved a little round the margin, from three to four inches long and one or one and half broad. *Stipules* minute, alternate, villous. MALE. *Flowers* short-peduncled, numerous, minute, yellow, collected into small globular heads in the axills, sometimes on short, axillary, glomerate racemes. *Calyx* five-leaved, or deeply five-parted; *segments* lanceolate, obtuse, or acute. *Corol* none. *Filaments* one, two or three; when one trifid; when two, one of them is bifid. *Anthers* always three, two-lobed, two-celled. FEMALE. *Racemes* small, simple, from last year's ramuli; there are also single peduncled flowers, scattered about the lower part of the present year's shoots, as in the lower axills thereof. *Flowers* larger than the male ones. green. *Calyx* as in the male. *Corol* none. *Stamina* none. *Germ* oval, villous,

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three-celled, with two ovula in each, attached from their apex to the top of the axis. *Styles* three, short. *Stigmas* large, crescent-shaped. *Drupe* obovate, or oval, of the size of a large gooseberry, smooth, white, one-celled. *Nut* oval, more or less pointed at both ends, somewhat triangular, very hard, rugose, one-celled. *Seed* solitary, conform to the nut. *Integuments* two; the *exterior* one which adheres to the nut, harder and lighter coloured; the *inner* one free, darker coloured, and spongy. *Perisperm* conform to the seed. *Embryo* inverse, nearly as long as the perisperm. *Cotyledons* oval, three-nerved. *Radicle* sub-cylindric, superior.

## DIOECIA PENTANDRIA.

### *ZANTHOXYLUM.*

MALE. *Calyx* five or more parted. *Corol* none. *Stamina* from five to eight. FEMALE. *Calyx* five-parted. *Corol* none. *Germs* as many as five, one-seeded; *attachment* superior. *Capsules* as many as five, one-seeded. *Embryo* inverse, and furnished with a perisperm.

Z. *alatum. Roxb.*

Shrubby, ramifications straight. *Thorns* stipulary; *leaflets* from two to five pair, opposite, lanceolate, serrulate, common petioles winged. *Panicles* axillary, male flowers with from six to eight stamina.

*Hind.* Durmur.

Zanthoxylum. *Asiat. Res.* vi. 376.

A native of Nepal, and other mountainous countries north of Bengal, Rohilcund, and Oude. In the Botanic garden they blossom during the hot and rainy seasons.

*Trunk* short. *Branches* several, straight, expanding, covered with dark brown bark, spotted with small, scabrous, white dots; our plants now ten years old, are from ten to twelve feet high. *Prickles* stipulary, straight, dark-colour-

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ed and sharp. *Leaves* alternate, unequally pinnate, from two to four inches long. *Leaflets* from three to thirteen, five or seven most common, opposite, sessile, lanceolate, in young plants crenulate, pretty smooth on both sides, with a few pellucid points containing a fragrant juice. *Petioles* winged. *Stipules* none. MALE. *Racemes* axillary, often compound, shorter than the leaves. *Flowers* minute, pale yellow. *Calyx* small, one-leaved, with from six to eight acute divisions. *Corol* none. *Filaments* six, seven, eight, much longer than the calyx. *Anthers* twin. *Pistillum* or hemispheric gland, with two or three elevations in the centre, like so many stigmas. FEMALE. *Racemes* as in the male. *Flowers* very minute, greenish yellow. *Calyx* as in the male. *Corol* none. *Stamens* none. *Germs* superior, as far as five, three or four are most common, one-celled, containing two ovula, attached to the top of the inner angle of the cell. *Styles* single, shorter than the germs, recurved. *Stigmas* single. *Capsules*, in general one, two, or three come to maturity, roundish, reniform, or ovate, of the size of a small pea when recent, when dry wrinkled, and much smaller, short-pedicelled, one-celled, two-valved, opening round the apex. *Seeds* solitary, conform to the capsule, attached to the middle of the margins of the capsule, on one side. *Integuments* two; the *exterior* one of a shining black, thick, porous, and brittle; the *inner* one thinner and brown. *Perisperm* conform to the seed, fleshy. *Embryo* inverse, nearly as large as the perisperm. *Cotyledons* round-cordate, three-nerved. *Radicle* superior, oblong.

Every part of the plant possesses a peculiar aromatic pungency, which I cannot well compare to any smell, or taste I am acquainted with. The seeds are used medicinally by the natives of the countries where the plants grow.

*ANTIDESMA. Schreb. gen. N.* 1518.

MALE. *Calyx* five-leaved. *Corol* none. *Anthers* twin.



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FEMALE. *Calyx* as in the male. *Corol* none. *Stigmas* from three to five. *Drupe* one-seeded. *Embryo* inverse, and furnished with a perisperm.

1. A. *pubescens. Willd.* iv. 763. *Roxb. Corom. pl.* ii. *No.* 167.

*Leaves* oblong, entire, downy. *Stipules* subulate. *Spikes* terminal, panicled.

Tsjeriam-cottam. *Rheed. Mal.* v. *t.* 11.

*Teling.* Polaree.

A small tree, a native of the Circar mountains. Flowering time the beginning of the rainy season.

*Leaves* alternate, short-petioled, bifarious, oval, entire, downy, from two to four inches long, and from two to three broad. *Stipules* subulate, downy. *Spikes* numerous, terminal, and from the exterior axills, downy; those of the male tree much longer and more slender. *Bractes* lanceolate, one-flowered. *Flowers* very small, of a greenish yellow. MALE. *Calyx* five-leaved, leaflets ovate, hairy. *Corol* none. *Filaments* five, spreading, longer than the calyx. *Anthers* double, singly globular. *Pistil* no other rudiments of one, than a tuft of wool. FEMALE. *Calyx* as in the male. *Corol* none. *Nectary* a yellow fleshy ring surrounding the base of the germ. *Germ* superior, obliquely oblong, hairy. *Styles* two, short, two-cleft, spreading. *Stigmas* simple. *Drupe* minute. *Nut* one-seeded.

The berries are eaten by the natives.

2. A. *paniculata. Willd.* iv. 764.

*Spikes* panicled. *Leaves* round, oval, villous. *Stigma* stellate. *Drupe* round.

*Beng.* Khoodi Jamb.

A small ramous tree, with light ash-coloured bark, common in the forests of Bengal. Flowering time the month of April, the seed ripens in July.

*Leaves* alternate, sub-bifarious, short-petioled, round-oval, often emarginate, entire, villous, particularly underneath;

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lanceolate, caducous. *Spikes* terminal, and axillary, panicled, sub-cylindric, downy. *Bractes* minute, one-flowered, from one to three inches long, and nearly as broad. *Stipules* downy. *Flowers* numerous, minute, sessile, of a pale greenish yellow. MALE. *Calyx* five-leaved; *leaflets* oblong, woolly. *Corol* none. *Filaments* five, twice, or more, longer than the calyx, inserted round the base of an hemispheric, hairy receptacle. *Anthers* twin. *Pistil* no other than a gland in the centre of the receptacle. FEMALE. *Calyx* five-toothed. *Corol* none. *Nectary*, a yellow, villous ring surrounding the base of the germ. *Germ* obliquely ovate. *Style* scarcely any. *Stigma* generally of five stellate divisions. *Berry*, rather drupe in this species, small, round, smooth, when ripe of a dark purple, pulp of a pleasant subacid taste. *Nut* single, one-seeded. *Embryo* inverse, and furnished with a perisperm.

*SPINACIA. Schreb. gen. N.* 1520.

MALE. *Calyx* four or five-parted. *Corol* none. FEMALE. *Calyx* two, or four-cleft. *Corol* none. *Styles* four. *Seed* one, within the indurated calyx. *Embryo* annular, with an inferior radicle, and furnished with a perisperm.

S. *tetrandra. Roxb.*

Annual, erect. *Leaves* variously lobed. *Flowers* hispid, sessile, the *male* ones tetrandrous, the *female* calyx two-parted.

*Hind.* and *Beng.* Pinnis.

*Arab.* and *Pers.* Ispanj, or Ispanaj; these point out the derivation of our generic name, which has been doubtful.

It is much cultivated in Bengal and the adjoining provinces; being a pot-herb held in considerable estimation by the natives.

*Stem* erect, from twelve to twenty-four inches high, round, smooth, piped, succulent, sometimes reddish. *Leaves* al-



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ternate, the lower ones very long-petioled, variously lobed with lobes of an acute triangular shape, smooth on both sides. MALE. *Flowers* on long terminal glomerate spikes, and on shorter ones from the axills; very numerous, sessile. *Calyx* four-parted. *Stamens* four. *Anthers* twin, very large. FEMALE. *Flowers* axillary, sessile, crowded. *Calyx* two-tipped, with a projecting horn in each side, growing into spines when the seed is ripe. *Styles* generally four, white, tapering. *Capsule* one-celled, one-valved, armed, with two opposite short horns, and crowned with the small remaining calyx.

*CANNABIS. Schreb. gen. N.* 1522.

MALE. *Calyx* five-parted. *Corol* none. FEMALE. *Calyx* one-leaved, entire, opening on the side. *Corol* none. *Styles* two. *Seed* solitary, shut in the calyx. *Embryo* curved, inverse, without perisperm.

C. *sativa. Willd.* iv. 768.
*Sans.* Banga, or Ganjika.
*Arab.* Kinnab.
*Hind.* and *Pers.* Bang.
*Beng.* Ganga.
*Teling.* Ganjai.
Cannabis Indica. *Rumph. Amb.* v. *t.* 77.
Kalengi cansjava. *Rheed. Mal.* x. *t.* 60. the male; Tsyeru cansjava, *t.* 61. the female.

Indigenous amongst the hills and mountains north of India, and common every where in the gardens of the natives throughout Asia. The leaves of the male plant, as well as the flowers of the female are dried, and mixed with tobacco for smoking. They also bruise and mix with water for drinking the flowers of the male plant; this preparation is called Siddhee. They are all powerfully narcotic. The bark they make no use of in India, though equally strong, when carefully prepared, as the hemp of Russia. But

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Captain Hardwicke, on whom we can depend, observes, *As. Res.* vi. *p.* 376. that the natives in several parts of the mountains above Hurdwar manufacture a coarse, thick cloth from the bark, which the poorer people wear.

I perfectly agree with Willdenow, in thinking all the varieties, if even such they can be called, centre in one species. From the same seed and even on the same plant, I have found the leaves both opposite and alternate; and sometimes the more rare male and female flowers on the same individual, and even hermaphrodite.

## DIOECIA HEXANDRIA.

### *CALAMUS. Schreb. gen. N.* 589.

MALE. *Perianth* three-parted. FEMALE. *(Female hermaphrodite* or *hermaphrodite.) Perianth* three-toothed. *Corol* three-parted. *Stamina* six, abortive. *Germ* superior, three-celled; *cells* one-seeded; *attachment* inferior. *Berries* backwardly imbricated with cartilaginous scales, generally one-seeded. *Embryo* in the base of the perisperm.

1. C. *Zalacca. Willd.* ii. 204.

Shrubby, not scandent nor flagelliferous, stoloniferous. *Leaflets* numerous, approximate, alternate, opposite, linear, bristly on both sides. *Inflorescence* radical. *Berry* obliquely turbinate, generally three-seeded.

Calamus Zalacca. *Gært. Sem.* ii. *t.* 139. *f.* 1.

Zalacca. *Rumph. Amb.* v. *t.* 57. *f.* 2.

A native of the Malay Islands. The pulp of the fruit is eaten by both Malays and Europeans.

2. C. *humilis. R.*

Shrubby, not scandent nor flagelliferous. *Leaflets* lanceolar, smooth, many-nerved. *Spines* few, but long and strong.

A native of Chittagong.

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3. C. *erectus. R.*

Shrubby, erect, no flagelli. *Leaflets* rather remote, equidistant, opposite and alternate, linear-lanceolar. *Spines* subverticelled. *Spadix* compound. *Berries* oblong.

Sun-gotta, the vernacular name in Silhet, where it grows with an erect trunk, like the true palms, of about fifteen feet in height; when divested of the sheaths, from three to four inches in circumference; and the joints from two to three inches long. The poorer natives use the seed as a substitute for areca.

4. C. *draco. Willd.* ii. 203.

Scandent, destitute of flagelli, dreadfully armed with long flattened elastic spines, often in rows and united at the base. *Leaflets* alternate, ensiform, spinous, bristled. *Spadix* decompound, oblong.

Palma juncus draco. *Rumph. Amb.* v. *p.* 114. *t.* 58. *f.* 1. good.

Dsirenung. *Kæmpf. Amoen. Exot.* 552.

A native of Sumatra and the Malay Islands. Flowering time March and April.

*Trunk* while the plants are young, erect, and then resemble an elegant, slender palm tree, armed with innumerable dark coloured, flattened, elastic spines, often disposed in oblique rows, with their bases united. By age they become scandent, and overrun trees to a great extent. *Leaves* pinnate, their sheaths and petioles armed as above described. *Leaflets* single, alternate, ensiform, margins remotely armed with stiff, slender bristles, as are also the nerves; from twelve to eighteen inches long and about three quarters of an inch broad. *Spadix* of the *female hermaphrodite* inserted by means of a short, armed petiole on the mouth of the sheath opposite to the leaf, oblong, decompound, resembling a common oblong panicle. *Spathes* several, one to each of the four or five primary ramifications of the spadix, lanceolate, leathery; all smooth except the exterior or lower one which is arm-

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ed on the outside. *Calyx* of the female or rather *female hermaphrodite. Perianth* turbinate, ribbed; *mouth* three-toothed, by the swelling of the germ it splits into three portions, and in this manner may be seen adhering with the corol, to the ripe berries. *Corol* three-cleft; *divisions* ovate-lanceolate, twice as long as the calyx, permanent. *Filaments* six, very broad, and inserted into the base of the corol. *Anthers* filiform, and seemingly abortive. *Germ* above, oval. *Styles* short. *Stigma* three-cleft; *divisions* revolute, glandular on the inside. *Berry* round, pointed, of the size of a cherry.

5. C. *latifolius. Roxb.*

Scandent. *Leaves* flagelliferous; *leaflets* in a few remote fascicles, of three or four each, broad, lanceolar, many-nerved, smooth, convex above.

Korak Bet of the natives of Chittagong, where it is indigenous and runs over trees to an immense length. When freed from the sheaths of the leaves it is about as thick as a slender walking cane. Plants introduced by Mr. W. Roxburgh, in 1801, into the Botanic garden, flowered for the first time in November and December 1809, when they had attained to the height of about forty feet.

*Spines* numerous on the stems, sub-verticilled, very large, flat and divaricate. On the flagelli fascicled and recurved. *Leaves* alternate, pinnate, from six to twelve feet long including the whip or flagelli, which terminates the common petioles as in many of Rumphius's figures; and the leaf of his *Palma juncus equestris, vol.* v. *t.* 56. is tolerably like that of my plant, but their size is very different. *Leaves* in seven or eight remote facicles, of three or four each, broad-lanceolate, very erect, many-nerved, smooth on both sides; with the margins triflingly spinous-dentate, and the upper surface always convex, from ten to eighteen inches long, and from three to six broad. MALE. *Spadix* supra-decompound; all the divisions bifarious. *Flowers* small, of a greenish yellow,

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each sitting in a cup composed of two concave sheathing bractes. *Calyx* three-toothed. *Corol* three-parted. *Filaments* six, inserted on the imperforated base of the corol. *Anthers* incumbent. *Pistillum* none, a small three-lobed gland occupies its place.

6. C. *rudentus. Willd.* ii. 203.

Scandent. *Leaves* flagelliferous; *leaflets* numerous, equi-distant, uniform. *Male spadix* super-decompound.

Palma juncus albus. *Rumph. Amb.* v. *t.* 53.

A native of the Moluccas, from thence introduced into the Botanic garden in 1798, where in thirteen years it blossomed for the first time, when it had attained to the length of thirty feet, and its general thickness, when deprived of the sheaths of the leaves, was that of a very stout walking cane; the joints are smooth, and from eight to twelve inches long. *Leaves* alternate, as in the genus. *Leaflets* numerous, equi-distant, and equally arranged on each side of the petiole, uniform; margins armed with minute spinulæ, pointing forward, and the chief nerves here and there with a stiff spinous bristle; about two feet long, and about an inch broad. *Petioles* armed with a few, short, recurved spines on the exterior part of the under side, and many smaller straight ones on the upper; from eight to ten feet long, besides its terminal, drooping, armed whip, which is not much shorter than the body, or foliferous parts. *Sheaths* armed with slender spines disposed in belts. *Male spadices* from the sheaths of the petioles, supra-decompound. *Spathes* numerous, armed with very small, short, straight spines. *Calyx, corol* and *stamina*, exactly as in the other species.

7. C. *verus. Willd.* ii. 203.

Scandent. *Leaves* flagelliferous. *Leaflets* numerous, equi-distant, uniform, three-nerved; *stipes* dreadfully armed with innumerable flat, ensiform spines. *Spadix* panicled, oblong.

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Palma juncus verus angustifolius. *Rumph. Amb.* v. *t.* 54. *f.* 2.

A native of Amboyna, &c. In the Botanic garden are many plants of this species, brought from the Molucca Islands in 1798, where in twelve years they began to blossom, and in that time their length was under thirty feet; and the ratan, when cleaned, about as thick as the little finger, with joints from six to eight inches long. In this the whole of the petioles, particularly toward the base, are more armed than in any other species I have yet seen, with flat, thin, elastic, very sharp, tortoise-shell coloured spines of all sizes, from a line to two inches long.

8. C. *extensus. R.*

Scandent. *Leaves* flagelliferous; *leaflets* alternate, remote, equi-distant, narrow-lanceolar. *Spines* in belts, slender. *Berries* spherical.

Deu-gullar the vernacular name in Silhet, where it is indigenous, and is of great extent, say two to three hundred yards; when cleaned toward the base, it is not thicker than a man's fore-finger, but as thick as the wrist toward the apex. The length of the joint is from six to twelve inches.

9. C. *quinquenervius. R.*

Scandent. *Leaves* flagelliferous; *leaflets* few, remote, equi-distant, lanceolar, five-nerved. *Spines* distinct, few, short and strong; *spadix* decompound.

Hurnur-gullar the vernacular name in Silhet, where this species is found, running over trees, to a great extent; the ratan when cleaned is about as thick as a man's finger throughout, and the joints from six to eight inches long.

10. C. *Rotang. Willd.* ii. 202.

Scandent. *Leaflets* solitary, equi-distant, sublinear-lanceolate; *sheaths* flagelliferous.

*Sans.* Vetra, vetus.



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*Beng.* Bet, or Sanchi-bet.

I cannot take upon me to quote any of Rumphius's figures for this plant. It is a native of Bengal, and the Coromandel coast, delights in a rich, moist soil, where there are bushes and trees for it to climb on. Flowering time the rains; the fruit ripens during the cold season.

*Root* fibrous. *Stem* joined, climbing to a vast extent, enveloped in the thorny sheaths of the leaves; with them it is about as thick as a man's little finger; when they are removed, it is in thickness, and every other respect, a common ratan. *Leaves* pinnate, from eighteen to thirty six-inches long. *Leaflets* opposite or alternate, sessile, linear-lanceolate, armed in the margins with minute bristles pointing forward, and a few distinct, long, erect bristles on the upper surface, from six to twelve inches long. *Sheaths* cylindric, armed with numerous, strong, straight, compressed thorns. *Petioles* sheathing, the leaflet-bearing portion compressed, channelled, and armed with both straight and recurved thorns on the under side. *Flagelli*, one from the sheath of each leaf near its mouth they are very long, slender, drooping or waving, and well armed, resembling the slender lash of a whip; many of Rumphius's figures of these plants have such terminating the rib or rachis of the leaves. MALE. *Calyx* universal; *spathe* none; partial many, scattered. *Spadix* supra-decompound, drooping, being the above mentioned flagelli much enlarged, with numerous, partial, truncate spathes, with alternate, decompound, bifarious, recurved spikes therefrom, the ramifications thereof recurved, bearing in two rows on their convex sides numerous minute greenish flowers. *Perianth* three-parted, smaller than the corol, permanent. *Corol* one-parted. *Tube* imperforated. *Border* three-parted; divisions oval, permanent. *Filaments* six, thick at the base, tapering, nearly as long as the corol and inserted on the mouth of its tube. *Anthers* incumbent. *Germ* none, but there is the rudiment of a three-cleft stigma. FEMALE. *Calyx; sheaths* as in the male. *Spadix* decompound, *perianth* and *corol* as in the

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male. *Filaments* six, united at the base round the germ. *Anthers* arrow-shaped, abortive. *Germ* round. *Style* short, three-cleft, divisions or stigmas recurved. *Berries* round, of the size of a small gooseberry, imbricated backward with barky scales, one-celled, one-seeded, between the bark and the seed there is a considerable portion of whitish juicy pulp of a sharp acid taste. *Seed* solitary, marked with many irregular depressions and elevations, and on one side there is a large, deep, roundish pit, a little below it near the base is lodged the monocotyledonous embryo.

As already observed the full grown-plant, when divested of the sheaths of the leaves, resembles so much the common ratan of Malacca, that I have scarcely a doubt of their being the same; for that reason the specific name *Rotang* is adopted until we are better acquainted with those figured by Rumphius.

11. C. *fasciculatus. Roxb.*

Scandent. *Leaflets* in many fascicles, ensiform, margins spinous, bristly. *Sheaths* flagelliferous.

Tsjeru-tsjurel, *Rheed. Mal.* xii. *p.* 121. *t.* 64. agrees in its foliage better with this than with the former.

Palma juncus viminalis. *Rumph. Herb. Amb. vol.* v. *t.* 55. *f.* 2. agrees pretty well with this species, but not his decription.

*Sans.* Umba-vetus.

*Hind.* and *Beng.* Bura-bet.

With C. *Rotang* this is a native of thickets, and woods all over Bengal, Cuttack, and many other places; though I never saw it to the southward of Ganjam. Flowering time, the rainy season.

*Stem* as in C. *Rotang* but thicker, when young, viz. from four to eight feet high, they are erect, at which time they resemble a beautiful palm on a small scale; when longer they lean in search of support, and finally climb over trees, and bushes like the other species, and are equally extensive.



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*Leaves* and *petioles* as in C. *Rotang*, but more armed. *Leaflets* collected into fascicles of two, three, or four, on the opposite sides of the stipes, with a vacant space of considerable extent between; they are broader considerably than in C. *Rotang*, scarcely so long, and armed with spinous bristles on the edges and both sides of the nerves. MALE. *Flagelli*, *spathes*, *spadix*, *perianth*, *corol*, and *stamens*, as in the former species. FEMALE. *Perianth*, *corol* abortive; *stamens* and *pistillum* as in C. *Rotang*. *Berries* as in the former, but small.

The stems divested of the sheaths of the leaves, are about as thick as a man's fore-finger, and employed for walking canes like those of the ground ratan, *Rhapis flabelliformis*.

12. C. *polygamus*. *R.*

Scandent. *Spines* sub-verticled. *Sheaths* flagelliferous. *Inferior leaflets* in remote fascicles of three or four, above single and alternate, or opposite, all linear, with a few bristles on the margins and nerves underneath. *Male* and *hermaphrodite flowers* on the same supra-decompound spadix.

Hoodoom Bet of the people of Chittagong, where it is indigenous, and a most extensive rambler; the general thickness when cleaned is that of a stout walking cane. Its growth is exceeding slow, for in ten years it had acquired a stem of only five feet in length, and the leaves from ten to twelve more.

13. C. *tenuius*. *R.*

Polygamous, scandent. *Leaves* pinnate; *leaflets* numerous, solitary, equi-distant, alternate, three-nerved, linear. *Sheaths* flagelliferous. *Spadix* decompound. *Hermaphrodite calyx* and *corol* urceolate.

Bandhari Bet of the inhabitants of Chittagong, where it is indigenous. It is a beautiful, delicate species; when divested of the sheaths of the leaves, and cleaned, it is not thicker than a common quill, and of the colour of the common ratan. Flowering time, the rainy season.

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*Stems* simple, perennial, climbing to a great extent; the extremities inserted in the armed sheaths of the leaves, including these, it is scarcely so thick as a common ratan. *Leaves* oblong, equally pinnate, nearly two feet long. *Leaflets* from twenty to thirty on each side, equi-distant, alternate, linear polished, three-nerved; *margins, apices,* and *nerves* bristly; six inches long, and scarcely half an inch broad at the broadest part. *Petioles* armed. *Flagelli* from the sheaths, simple, armed, as in the other species. *Spathes* numerous, sheathing, sub-cylindric, one for each division of the spadix, even to the pairs of flowers. *Spadices* occupy the place of the flagelli on a few of the spathes, decompound; primary branches, four, five, or six, remote, flexuose, with about half a dozen alternate, recurvate branches on each side. *Hermaphrodite* and *male flowers* in alternate pairs, the latter short-pedicelled. MALE. *Calyx* shorter than the corol, unequally two, or three-toothed, corol supported on a fleshy gibbous receptacle, border two or three-cleft. *Filaments* four, five, or six. *Anthers* sagittate. HERMAPHRODITE. *Calyx* and *corol* equal, gibbous, with a contracted, three-toothed mouth. *Filaments* six, united in a ring round the lower half of the germ; *anthers* sagittate, large, and seemingly fertile. *Germ* ovate, one-celled, containing three seeds attached to the bottom of the cell. *Style* scarcely any; *stigma* three-cleft; *segments* rugose and recurvate.

14. C. *pencillatus. R.*

Scandent. *Leaflets* thirty-four pair, regularly alternate except the terminal two, which are united, lanceolate, seven to nine-nerved; margins entire and smooth, a pencil of bristles from the apex of each. *Sheaths* flagelliferous.

Found by Mr. Roxburgh in the forests of Pulo Pinang running over trees. It is more slender than the common ratan, and less so than the next species, C. *gracilis.*

15. C. *gracilis. R.*

Scandent. *Leaves* with from six to ten pair of linear-lan-

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ceolate, three-nerved leaflets in three remote fascicles; *sheaths* flagelliferous.

Mapoori Bet of the Hindoos of Chittagong.

Tsjera-tsjurel. *Rheed. Mal.* xii. *t.* 64.

A native of the forests of Chittagong, where Mr. W. Roxburgh found it climbing over trees and bushes to a great extent, and in flower in the month of May. This species is uncommonly slender when divested of the sheaths of the leaves and dry, scarcely as thick as a common quill, in texture firm and elastic, covered with a smooth, straw-coloured crust as in the common ratan.

*Stems* simple, perennial, climbing to a great extent; all the tender or younger parts toward their extremities invested, in the armed sheaths of the leaves, including these about as thick as a man's little finger. *Leaves* alternate, recurved interruptedly pinnate, if I may be allowed to call a pinnated leaf so, which is destitute of smaller leaflets between the principal ones, from one to two feet long. *Leaflets* collected in three opposite bundles of from two to four pair each, with much more of the rachis left naked between them than the spaces they occupy, sessile, doubled backwardly at the base, linear-lanceolate, bristly, pointed, both surfaces lucid, three-nerved; nerves on the upper side as well as the margins, bristly, from three to five inches long, and less than one inch broad. *Rib* or *rachis* carinated along the upper side, when young covered with ferruginous dust, rounded underneath, and armed with recurved prickles. *Flagelli* or *tendrils*, issue single as in the other species, from near the mouths of the sheaths of the leaves; they are long, jointed, slender as a pack-thread, drooping, sheathed, armed with numerous, very sharp, recurved prickles. MALE. *Spadix* from the mouths of the sheaths or opposite sides of the flagelli, compound, jointed; joints approximate, sheathed; ramifications recurved, bearing two rows of sessile flowers on their convex side. *Calyx* one-leaved, tridentate, sitting on the joints of the rachis in a three-toothed cup, which may be

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called a lower or exterior calyx. *Corol* three-parted, with the base fleshy, and partly impervious. *Filaments* six, thick at the base, and inserted on the mouth of the fleshy impervious tube of the corol. *Anthers* linear, incumbent. *Pistillum*, a small, three-toothed, abortive, style-like body is all that is to be found.

16. C. *monoicus.*

Monoicous, scandent. *Leaflets* numerous, alternate, linear-lanceolate, polished, and bristly; *sheaths* flagelliferous; *stamens* monadelphous.

Native place uncertain. It grows in the Botanic garden to be about the size of the common ratan, and differs from it only in being monoicous, the divisions of the corol lanceolate, and in the *filaments* being very completely united. Flowering time the rainy season.

It is needless to give a full description of this plant, which is exactly like C. *Rotang*, except in the above-mentioned circumstances. The *male* flowers are about as numerous as the *female* ones, generally one of each from each of the annular scales of the branches of the spadix. The common ratan (C. *Rotang*) I have always found completely dioecous; this must therefore be considered a distinct species.

*PHŒNIX. Schreb. gen. N.* 1694.

MALE. *Calyx* three-toothed. *Corol* three-petalled. FEMALE. *Calyx* and *corol* as in the male. *Germs* three, one-celled, one-seeded; *attachment* interior. *Drupe* oblong, pointed, one-seeded. *Embryo* in the back or convex side of the perisperm.

1. P. *acaulis. Buch.*

Stemless. *Leaves* radical, pinnate; *leaflets* folded, ensiform, in sub-opposite fascicles pointing many ways, the lower spinous.

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A native of Behar. Flowering time in the Botanic garden the cold season. The seed ripens in April and May.

*Stem* none in plants ten years old; at this age when in flower, the whole body of the plant, including the inflorescence, but exclusive of the foliage, is of an ovate form, and not exceeding six or eight inches in height from the surface of the ground. *Leaves* (*fronds*, L.) pinnate; from two to six feet long. *Leaflets* in nearly opposite, rather remote fascicles; the superior ones folded, slender, ensiform, and about eighteen inches long; the lower ones small, straight, rigid, and ending in very sharp, spinous points. *Petioles* (*stipes*) near the base flat, towards the apex triangular, smooth. MALE. *Spathes* and *spadix* as in the female, hereafter described. *Flowers* alternate, solitary, sessile, small, pale yellow. *Calyx* one-leaved, triangular; *angles* or *lobes* acute and unequal. *Corol* three-petalled; *petals* obliquely-lanceolate, acute, slightly united at the base. *Filaments* six, very short, inserted into the base of the corol. *Anthers* linear, nearly as long as the petals. *Pistil* none. FEMALE. *Spathes* universal, axillary, solitary, one-valved, about six inches long, with their base rather below the surface of the earth, generally splitting into two portions down the middle, on each side. *Spadix* ramous, composed of many, simple, short, erect, flexuose branches; all are smooth, and of a pale yellow. *Flowers* alternate, solitary, sessile, in bractiform notches on the sides of the branches of the spadix. *Calyx* cup-shaped, truncate, with three obscure points at equal distances on the margin. *Petals* three, sub-rotund, thick and fleshy, concave, smooth. *Nectary* a small, six-toothed cup, in which the germs sit. *Germs* three, each one-celled, and containing a single ovulum attached to the middle of the cell on the inside. *Styles* three, recurved, small, and short. *Stigma* small. *Drupe* oval, fleshy, small, smooth, of a bright red, of the size of a very small olive, one-celled. *Seed* solitary, oblong, with a deep longitudinal groove on one side. *Embryo* in the middle of the back, or convex side of the seed.

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2. P. *farinifera. Willd.* iv. 731. *R. Corom. pl.* i. *N.* 74.

*Stem* scarcely any. *Leaves* pinnate; *leaflets* opposite, rigid, the lower pair ending in spines.

Phœnix pusilla. *Gært. Sem.* i. *t.* 29. *Lourier. Cochin. Ch.* 753.

*Teling.* Chilta-eita.

This dwarf species of the date tree is a native of dry, barren ground, chiefly of the sandy lands at a small distance from the sea near Coringa. It flowers in January and February. The fruit ripens in May.

*Trunk*, the little it has is only about one or at most two feet high, and so entirely enveloped in the sheaths of the leaves that it is never seen, the whole appearing like a large round bush. *Leaves* pinnate. *Leaflets* opposite, sword-shaped, much pointed, smooth, of a deep green. *Spathes* axillary, one-valved, concave on the inside, fitting the trunk or base of the leaf immediately within it; this concavity is bordered by two sharp edges; convex on the outside, there splitting longitudinally, leathery, smooth, withering. *Spadix* erect, very ramous, branches simple, spreading in every direction, from eight to twelve inches long. MALE FLOWERS. *Calyx* small, slightly three-toothed. *Petals* three, oblong, white, rigid. *Filaments* six, very short, inserted into a fleshy globular receptacle. *Anthers* oblong, erect. FEMALE FLOWERS on a separate plant. *Calyx* as above. *Petals* three, orbicular, concave, equal, rigid, lasting. *Germs* three, though never more than one ever increases in size, the other two always wither, although they contain the rudiment of a seed every way like the fertile germ; ovate, each ending in a short recurved style. *Stigma* simple. *Berry* when ripe, of a shining black, of the size of a large French bean; the *pulp* is sweet and mealy, but in small quantity, the natives eat them as gathered from the bush without any preparation. *Seed* cartilaginous, of the shape of the berry, grooved longitudinally, as in the common date, pretty smooth, brown on the outside, of a light grayish white within, on the middle of the back



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there is a small elevation, under which is an oblong pit containing the embryo or first principle of the new plant.

The leaflets are wrought into mats for sleeping upon, &c. The common petioles are split into three or four, and used to make common baskets of various kinds, but they are not so good for this purpose as the Bamboo, which is very elastic, much more durable, and splits easily. The small trunk when divested of its leaves, and the strong brown fibrous web that surrounds it at their insertions, is generally about fifteen or eighteen inches long, and six in diameter at the thickest part; its exterior or woody part consists of white fibres matted together, these envelope a large quantity of farinaceous substance, which the natives use for food in times of scarcity. To procure this meal, the small trunk is split into six or eight pieces, dried, and beat in wooden mortars, till the farinaceous part is detached from the fibres; it is then sifted to separate them, the meal is then fit for use. The only further preparation it undergoes, is the boiling it into a thick gruel, or as it is called in India, *Kanji;* it seems to possess less nourishment than the common sago, and is less palatable, being considerably bitter when boiled; probably a little care in the preparation, and varying the mode, might improve it; however, it certainly deserves attention, for during the end of the last, and beginning of this year, and even again at this present time, May 1792, it has saved many lives. Rice was too dear, and at times not to be had, which forced many of the poor to have recourse to these sorts of food. Fortunately it is one of the most common plants on this part of the coast, particularly near the sea.

3. P. *dactylifera. Willd.* iv. 730.

*Leaves* pinnate, unarmed; *leaflets* folded together, linear-lanceolate, strait.

Numerous attempts have been made to familiarize this useful tree to the soil and climate of India, but I have not been able to learn that any one has been successful. I have

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raised thousands from seed in the Botanic garden, many of which I have tried to bring to perfection there, and have distributed others over many parts of the country. The greatest advance that I have yet known, has been that some male trees lived to blossom, soon after which they have uniformly perished.

Captain Benjamin Blake who was lately at Bussora informs me that he used frequently to walk in these date gardens, and observed their method of impregnating the *female flowers*, which was by making a slit in the *spathe* a little before it would burst spontaneously, and thrusting into it a branch, or a part, of the *male spadix*, where it was left. This he says, was the whole of the operation, and it appears a much more certain method, than hanging the male branch over the female.

4. P. *sylvestris. R.*

*Leaflets* in sub-opposite fascicles, ensiform, spinous-pointed, pointing four ways.

Katou-indel. *Rheed. Mal.* iii. *t.* 22. 23. 24. and 25.

*Teling.* Pedda-eita.

*Sans.* Khurjura.

*Beng.* Khujjoor.

Elate sylvestris. *Linn.*

This tree is very common all over India, all soils and situations seem to suit it equally well. Flowering time the beginning of the hot season.

Its parts of fructification are exactly as in P. *farinifera*, except that here are six small nectarial scales round the base of the germs. But it differs from it most conspicuously in growing to be a tree with a long, pretty thick trunk, and having longer yellowish or reddish fruit. This tree yields *Tari*, or Palm wine during the cold season. The method of extracting it destroys the appearance and fertility of the tree. The fruit of those that have been cut for drawing off the juice being very small.



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The mode of extracting this juice is by removing the lower leaves and their sheaths, and cutting a notch into the pith of the tree near the top, from thence it issues and is conducted by a small channel made of a bit of the Palmyra tree leaf into a pot suspended to receive it. On the coast of Coromandel this Palm juice is either drank fresh from the tree, or boiled down into sugar, or fermented for distillation, when it gives out a large portion of ardent spirit commonly called *Paria aruk* on the coast of Coromandel. Matts and baskets are made of the leaves.

The Bengalees call this tree *Khujjoor.* They also boil the juice into sugar. In the whole Province of Bengal about fifteen thousand maunds, or about a hundred thousand hundredweight is made annually. At the age of from seven or ten years, when the trunk of the trees will be about four feet high, they begin to yield juice, and continue productive for twenty or twenty-five years. It is extracted during the cold months of November, December, January, and February; during which period, each tree is reckoned to yield from one hundred and twenty to two hundred and forty pints of juice, which averages one hundred and eighty pints, every twelve pints or pounds is boiled down to one of *Goor* or *Jaguri*, and four of *Goor* yield one of good powder sugar, so that the average produce of each tree is about seven or eight pounds of sugar annually.

Another statement presented to me, gives a much larger produce, viz. the average produce of each tree is sixteen pints per day, four of which will yield two pounds of molasses, and forty of molasses will yield twenty-five pounds of brown sugar. The difference is so great, that I cannot well reconcile them, but am inclined to give most credit to the first.

Date sugar, as it is here called, is not so much esteemed as cane sugar, and sells for about one fourth less.

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5. P. *paludosa. R.*

Sub-arboreous. *Leaflets* solitary, ensiform, flaccid, bifarious. *Embryo* in the base of the seed.

*Sans.* Hintala.

*Beng.* Hintal.

A native of the lower parts of the Delta of the Ganges called the Sunderbunds, where it forms a considerable portion of those impenetrable woods which completely cover that extensive tract of country.

*Trunk* straight, as thick as a man's leg, and from six to sixteen feet high. *Leaves* pinnate, oblong, from three to six feet long, with the base extended into a multitude of tough fibres that embrace the stem and interior leaves. *Leaflets* solitary, opposite and alternate, bifarious, the lower few pairs short and spinous, the rest flaccid, sword-shaped, smooth, with acute filiform points, the longest of them from twelve to eighteen inches. *Spathe* simple as in the P. *sylvestris* and *farinifera*. *Spadix* ramous; *branches* numerous, generally undivided, and spreading in every direction. So far the male and female plants agree. MALE FLOWERS. *Calyx* cup-shaped, less regularly three-toothed, than in the above-mentioned two species. *Corol.* The three petals unite at the base into a firm receptacle which supports the stamens. *Filaments* six, short. FEMALE FLOWERS on a distinct plant. *Calyx* as in the male. *Corol.* The three petals distinct, roundish, concave. *Nectary* six small scales surrounding the base of the germs. *Germs* three; *styles* recurved, (although as in P. *sylvestris* and *farinifera* there are always three perfect germs, yet never more than one of them comes to maturity.) *Berry* the size of a field bean, oval, smooth, of a deep shining black, when ripe the pulp is a dirty looking, soft, greenish black substance, of an intolerable taste. *Seed* cartilaginous, as in P. *farinifera*, but in this species the *embryo* is lodged near the base of the seed.

The trunks of the smaller trees serve for walking sticks, and the natives have an idea that snakes get out of the way

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of any person having such a staff. The longer ones serve for rafters to their houses, and the leaves for thatch.

*BORASSUS. Schreb. gen. N.* 1689.

*Male spathe* universal, many-leaved. *Perianth* three-leaved. *Corol* three-petalled. *Female spathe* as in the male. *Perianth*, or *corol*, or both, from eight to twelve-leaved. *Germ* superior, three-celled; *cells* one-seeded, *attachment* interior. *Drupe* three-seeded. *Embryo* in the apex of the perisperm.

B. *flabelliformis. Willd.* iv. 800. *Corom. pl.* i. *N.* 71 and 72.

Lontarus domestica. *Rumph. Amb.* i. *t.* 10. *Gært. Fruct.* 21. *t.* 3.

Carimpana, *Rheed. Mal.* i. *t.* 9. the female tree; and *Ampara*, *t.* 10. the male.

*Sans.* Tala. See *Asiat. Res.* iv. *p.* 311.

*Beng.* Tal.

*Eng.* Palmyra.

*Teling.* Patoo-Tody, the name of the male tree, and Peuty or Nama-Tody, the female. Common all over India. It flowers in the hot season in Bengal, and the seeds ripen in August.

*FERRIOLA. R.*

MALE. *Calyx* and *corol* three-cleft. FEMALE. *Calyx* and *corol* three-cleft. *Germ* superior, three-celled; *cells* two-seeded; *attachment* superior; *style* single. *Berry* from one to three-seeded. *Embryo* inverse, amply furnished with perisperm.

F. *buxifolia. Willd.* iv. *p.* 798. *R. Corom. pl.* i. *N.* 45.

Trumbilli, that is *Iron wood*, of the Tamuls.

Pishinna of the Telingas.

Among the Circar mountains this grows to be a small tree,

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but in the low countries, it is only a shrub. It flowers during the hot season.

*Trunk* irregular. *Bark* of a dark rust colour. *Branches* very numerous, and very irregularly disposed. *Leaves* alternate, short-petioled, oval, entire, very smooth, shining, about half or three quarters of an inch long, by half an inch broad. MALE. *Flowers* from the axills of the lower leaves, three together smaller than the female ones. *Filaments* six, short, inserted round a semi-globose receptacle. *Anthers* oblong. *Pistil* none. FEMALE. *Flowers* axillary, single, sessile, very small, white. *Calyx* three-cleft. *Corol* three-cleft, hairy on the outside. *Stamens* none. *Germ* superior, oval, three-celled, with two ovula in each attached to the top of the axis. *Style* short. *Stigma* three-toothed. *Berry* superior, of the size of a large pea, round, smooth, when ripe yellow, from one to three-celled, partitions thin, tough, membranaceous. *Seed* one; I never found more, in each cell, differing in shape according to the number of fertile cells in the berry. *Integument* single, rather fleshy. *Perisperm* conform to the seed, of a soft, hairy, semi-pellucid consistence. *Embryo* inverse, nearly as long as the perisperm, a little curved. *Cotyledons* two, cordate. *Plumula* very minute. *Radicle* superior, clavate, pointing directly to the umbilicus.

The berries of this tree are universally eaten when ripe, and are very well tasted.

The wood is dark coloured, remarkably hard, and durable. It is employed for such uses, when its size will admit, as require the most durable heavy wood.

### *SMILAX. Schreb. gen. N.* 1528.

MALE. *Calyx* six-leaved. *Corol* none. FEMALE. *Calyx* six-leaved. *Corol* none. *Germ* superior, three-celled; *cells* one-seeded; *attachment* superior. *Styles* three. *Berry* from two to three-seeded. *Embryo* in the base of the perisperm.

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1. S. *glabra. R.*

Scandent. *Stem* and *branches* unarmed, columnar, polished. *Leaves* lanceolate, acuminate, rounded at the base, polish-three-nerved, glaucous underneath. *Umbellets* axillary, simple, sessile, solitary. *Calycine leaflets* broad, obcordate; sessile.

A native of the Silhet district, and of the adjacent Garrow country, where it is called *Hurina* or *Hurina-shook-China.* Its root is large and tuberous, and not to be distinguished by the eye, from the medicinal drug brought from China, under the name of *China root.* The natives of the above countries use a decoction of the fresh root annually, for the cure of sores and venereal complaints. It flowers about the end of the rains, and the seed ripens in the hot season. It is remarkable for its broad, obcordate, calycine leaflets, and large, two-lobed, sessile anthers. The flower-buds are broad and three-lobed.

2. S. *lanceæfolia. R.*

Scandent. *Stem* and *branches* unarmed, columnar, polished. *Leaves* lanceolar, three-nerved, polished. *Umbellets* simple, axillary, solitary, peduncled. *Calycine segments* linear, oblong.

*Gootea-shook-China* the vernacular name amongst the people of the eastern frontier, where the plant is indigenous, and its large tuberous roots much used in medicine; they are so like those of the *Smilax China* as not to be distinguished by the eye. It cannot therefore be Louriero's S. *lanceolata,* which he says has a long filiform root, not tuberous. By the natives where the plants grow, the juice of the fresh root is taken inwardly for the cure of rheumatic pains, and the refuse after extracting the juice, laid over the parts most pained. The whole plant, root included, is very much like my *glabra,* except in the structure of the flowers.

3. S. *Pseudo-China. Willd.* iv. 785.

Scandent. *Stem* and *branches* unarmed, columnar, smooth.

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*Leaves* from cordate to cordate-oblong, smooth, acuminate, five-nerved; *petioles* sub-cylindric, without stipuli.

*Beng.* Muhesha.

A native of the Garrow hills.

4. S. *laurifolia. Willd.* iv. 779.

Scandent, somewhat angular, armed. *Leaves* lanceolate and narrow, oblong, smooth, triple-nerved to the acuminate apex. *Umbels* compound. *Berries* from one to three-lobed, from one to three-seeded.

Koomari or Koomari-sookh-China of the Bengalees.

A native of the Garrow hills, where it grows to be a large, rambling, scandent, well armed perennial. Flowering time the hot season; the seed ripens about the end of the rains. On the permanent base of the petioles, just under the tendrils, are two large semicordate stipulæ. The umbellets are numerous, particularly in the female, forming panicles, with the long peduncled umbels in alternate threes on the angles of the rachis.

5. S. *retusa. R.*

Scandent, columnar, much armed. *Leaves* sub-ovate, cordate, retuse; with a triangular point, triple-nerved, with a fine intermarginal pair, stipules stem-clasping.

A most extensive rambler, a native of Bengal, every part glossy, which is indeed the case with all the East Indian species known to me.

6. S. *macrophylla. R.*

Scandent; *stem* and *branches* cylindric and prickly. *Leaves* sub-rotund, five-nerved, glossy. *Female umbellets* a few on a common axillary peduncle.

A very large and extensive, well armed species, a native of Bengal, where it blossoms about the beginning of the rains in June, and the seed ripens in October and November.

*Root* permanent, somewhat tuberous. *Stems* sometimes



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herbaceous, sometimes biennial or even perennial, round, armed with short sharp prickles, but void of every thing like pubescence, scandent, and ramous toward the root, as thick as a walking cane; the general length several fathoms; some seasons they perish down to the root at the approach of winter, and appear about the beginning of the hot season in February and March, at other times they are biennial or more. *Leaves* alternate, short-petioled, round, entire, five-nerved, glossy, six or eight inches each way. *Petioles* short, keeled, with the margins of the channel winged. *Tendrils* petiolary, undivided. FEMALE. *Peduncles* axillary, solitary, divided into two or three branches, each supporting a single, globular umbellet of large, greenish yellow, pedicelled flowers, inserted on a round scrobiculate receptacle. *Calyx* six-leaved; the *inner* series narrower. *Filaments* six, slender, and abortive. *Germ* globular, three-celled, with one ovulum in each, attached to the upper end of the axis. *Styles* recurved. *Berries* the size of a pea, red, smooth, generally one, or two-seeded. *Seed*, *perisperm*, and *embryo* as in the genus.

7. S. *ovalifolia. R.*

*Stems* cylindric, armed. *Leaves* unarmed, oval, smooth, from five to seven-nerved. *Petioles* tendril-bearing. *Umbels* compound.

*Beng.* Koomurki.

*Teling.* Kunda gurvatiga.

A native of hedges, forests, and wild places.

*Root* tuberous. *Stems* cylindric, climbing, woody; the larger woody parts armed with sharp, strong, incurved prickles. *Tendrils* paired, from the wings of the petioles, one on each side, simple. *Leaves* alternate, short-petioled, unarmed, oval, from five to seven-nerved, smooth on both sides, entire; from five to seven inches long. *Petioles* short, winged, channelled, bearing a simple tendril on each side of their base. Jointed just above the tendrils, and there, though the leaf drops, leaving the base with the tendrils for the support of the plant.

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*Umbels* axillary, compound; *umbellets* globular. *Peduncles* and *pedicels* columnar, smooth, coloured. *Bractes* two at the base of each peduncle, with smaller, reflexed, partial bracteoli to the umbellets. FEMALE. *Calyx* the three exterior leaflets larger, all revolute; *nectary* three subulate bodies within the calyx. *Germ* oblong. *Styles* short. *Stigmas* truncate. *Berries* above, red, smooth, succulent, two or three-seeded.

8. S. *prolifera. R.*

*Stem* and *branches* cylindric, prickly. *Leaves* unarmed, oblong, triple-nerved, with a slender marginal pair. *Umbels* proliferous, super-decompound; *umbellets* globular, long-peduncled.

A native of hedges and thickets in the vicinity of Calcutta where it blossoms in February and March.

*Root* strong, slender, hard, fibres springing from a small tuberous, hard, ligneous crown or base. *Stems* and *branches* perennial, scandent, of some few fathoms in length, round, armed with numerous, rather recurved, short, thick, sharp prickles. *Leaves* from lanceolar to oblong, triple-nerved, besides a very slender sub-marginal pair, entire, smooth on both sides, from three to four inches long, and from one to two broad. *Petioles* variously bent and ribbed, at the base a permanent, stipulaceous, cirriferous enlargement. MALE. *Umbels* axillary, proliferous, rather shorter than the leaves. *Umbellets* long-pedicelled, globular. *Flowers* numerous, middle sized, green. *Calyx* six-leaved, all linear and revolute, but the three exterior ones much broader. *Corol* none. *Filaments* six, as long as the calyx. *Anthers* linear-oblong, recurved. FEMALE. *Umbels* axillary, three or four times proliferous; *umbellets* globular, long-peduncled. *Flowers* numerous, small, of a greenish yellow, long-pedicelled. *Calyx* as in the male. *Filaments* or *nectaries* six, filiform, shorter than the petals. *Germ* superior, globular, three-celled, with one ovulum in each, attached to the top of the axis. *Styles* three, re-



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curved. *Stigmas* large and trifid. *Berry* globose, of the size and appearance of a red currant, one or two-seeded.

9. S. *maculata. Roxb.*

Shrubby, scandent, angular, and armed. *Leaves* hastate, cordate, entire, acute, from three to seven-nerved. *Racemes* both male and female, axillary.

A native of Nepal, from thence Dr. Buchanan sent seeds to the Botanic garden in 1802, where the plants blossom during the cold season, and ripen their seed by the month of May.

*Stems*, or rather *branches* numerous, shrubby, scandent, or resting on the ground, angular, and armed with short, slightly recurvate prickles. *Tendrils* in pairs from the base of the petioles, simple. *Leaves* alternate, petioled, hastate-cordate, margins entire, from three to seven-nerved, smooth, maculated with patches of pale green, with a dark margin, and a few small prickles on the nerves underneath, generally from three to six inches long, and from one to three inches broad. *Petioles* about an inch long, and somewhat angular and prickly. *Racemes* axillary and terminal, solitary, generally shorter than the leaves. *Flowers* numerous, in alternate fascicles of six or eight, pedicelled, white, fragrant. *Bractes* round the base of the pedicels, scariose, and very small. MALE FLOWERS. *Calyx* six-leaved. *Leaflets* oblong, smooth, spreading, the three exterior ones somewhat larger. *Filaments* erect. *Anthers* oblong. FEMALE FLOWERS nearly as in the male. *Stamina*, six small, abortive, round, subulate bodies inserted round the base of the germ. *Germ* oblong, smooth, three-lobed. *Styles* none. *Stigmas* three, oblong, recurved. *Berry* of the size of a pea, smooth, red, three-lobed, three-celled, with a single seed in each attached to the apex of the cells. *Perisperm* cartilaginous, of a pale bluish white colour. *Embryo* simple, small, cylindric, lodged in the base of the perisperm, opposite to the umbilicus.

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*DIOSCOREA. Schreb. gen. N.* 1530.

MALE. *Calyx* six-leaved, or six-parted. *Corol* none. FEMALE. *Calyx* as in the male. *Germ* inferior, three-celled; *cells* two-seeded; *attachment* superior. *Styles* three. *Capsule* three-celled. *Seeds* one or two, membranaceous. *Embryo* ascending, centripetal, and furnished with a perisperm.

1. D. *globosa. R.*

*Tubers* roundish, white. *Stems* twining, six-winged. *Leaves* alternate and opposite, sagittate-cordate. *Male spikes* compound, long, pendulous, and verticelled; *female* simple.

*Beng.* Choopuree aloo.

I have only found this species in a cultivated state; it holds the first place amongst the tuberous roots used for food by the Hindoos of these parts, and is also the most esteemed of the yams amongst Europeans in India.

*Root* tuberous, roundish, often very large; internally very white. *Stems* herbaceous, twining, of great extent, about six-sided, with the angles membrane-winged, and prickly toward the root. *Leaves* opposite and alternate, long-petioled, broad, sagittate-cordate, ensiform, pointed, waved, smooth, from five to seven-nerved. *Petioles* five-winged, nearly as long as the leaves. MALE. *Spikes* axillary, simple and compound; the compound ones very long, pendulous, and sub-verticelled. *Flowers* small, very numerous. FEMALE. *Spikes* axillary, simple, erect, with a few remote, very fragrant flowers.

2. D. *alata. Willd.* iv. 792.

*Tubers* oblong, white. *Stems* annual, twining, four-winged. *Leaves* opposite, deep cordate, from five to seven-nerved.

Volubilis nigra, &c. *Sloane's History of Jamaica, vol.* i. *p.* 139.

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*Beng.* Kam-aloo.

Katsji-Kelengu. *Rheed. Mal.* vii. *p.* 71. *t.* 38.

This species is much cultivated in various parts of India. On the Coromandel coast it is, I believe, the only species reared for food. In Bengal it holds only the second place, C. *globosa* being more esteemed; it is, however, much cultivated. Flowering time, the close of the rains.

*Tubers* oblong, brown on the surface, internally white, in a rich soil of great size, which perishes, after having produced that of the succeeding year. Besides the tubers, the proper roots of all those plants are fibrous, springing chiefly from, and about, the union of the stems with the tubers, and spreading in every direction. *Stems* herbaceous, twining over trees and bushes to a very great extent, somewhat four-sided, each angle enlarged with a copious, membranaceous, curled wing, otherwise smooth, often prickly toward the base. *Leaves* generally opposite; that is, the first only, that appears on the young shoots, being alternate; all long-petioled, deeply cordate, with the lobes protruding much, more or less rounded, and approximated, from five to seven-nerved, ensiform-pointed, smooth on both sides, various in size. *Petioles* nearly as long as the leaves, five-winged, enlarged at the base, coloured, and stem-clasping. MALE. *Spikes* compound, or panicled. FEMALE. *Spikes* axillary, compound, and simple, smooth. *Bractes* three-fold, one-flowered. *Flowers* remote, small, and green.

The description of *Ubium ovale*, *Rumph. Amb. vol.* v. *p.* 356. *t.* 125. agrees pretty well with this plant, so far as relates to the stems and leaves; but in the root they disagree; no inference can be drawn from the figure.

3. D. *rubella. Roxb.*

*Tubers* oblong, red-skinned; *stems* twining, six-winged. *Leaves* opposite, sagittate-cordate, smooth, five or seven-nerved, with subulate points.

*Beng.* Guranya aloo.

Ubium digitatum. *Rumph. Amb.* v. *t.* 121.

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This I have only found in its cultivated state, the natives esteem it next in rank to *D. purpurea*, consequently it holds the fourth place in their estimation amongst the *Dioscoreas*, and is much cultivated about Calcutta.

*Root* tuberous, deeply tinged with red immediately under the epidermis, or scarf skin, but this colour does not penetrate deep, they are of an oblong shape, and sometimes as much as three feet long in a rich soil. *Stems* herbaceous, twining, about six-seeded, with rather winged angles, otherwise smooth, and tinged with red in most parts. *Leaves* opposite, petioled, sagittate-cordate, entire, from three to seven-nerved, smooth, subulate, pointed. *Petioles* as in D. *alata*. MALE. *Spikes* axillary, simple and compound, when simple crowded, and shorter than the leaves. *Flowers* numerous, minute. *Calyx* as in the genus. FEMALE. *Spikes* axillary, generally simple, longer than the leaves. *Flowers* remote, very fragrant. *Abortive stamens* large, and distinct, almost like those of the male.

4. D. *purpurea*. *R.*

*Tubers* oblong, reddish throughout; *stems* twining, six (or more) ribbed or winged. *Leaves* opposite, and alternate, cordate.

*Beng.* Lal-*gu*rany*a*-al*oo*.

This also I have found only in a cultivated state, where it is wild I know not. The root is esteemed the next best to that of D. *alata*, consequently holds the third place amongst the *Aloos*. It is much cultivated.

*Root* oblong, throughout of a lighter, or darker purple, but always considerably deep in the tinge, and the farmers or cultivators of this species, say this colour is permanent. *Stems* sub-herbaceous, being sometimes perennial near the base, twining, six or more winged, or smooth; when the roots are more than one year old, the lower permanent parts of the stems are generally armed with prickles. *Leaves* opposite and alternate, long-petioled, cordate, with a subu-

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late point, five to seven-nerved, smooth, glossy green above, paler underneath. *Petioles* stem-clasping, winged, as in the other species. *Male* and *female spikes*, as in the last described.

5. D. *atropurpurea. R.*

*Tubers* sub-rotund, purple throughout. *Stems* annual, twining, four-winged, wings coloured and curled. *Leaves* profoundly cordate, from five to seven-nerved.

This is the species so extensively cultivated at Malacca, Pegu, and the eastern islands. The *tubers* are very large, of an irregular, smooth, roundish shape, and growing so near the surface of the earth, as to appear in dry weather through the cracks that they make by raising the soil over them. This, and the very deep colour of the yarn, renders it readily distinguished; the *stems* and *branches* are sometimes as far as six or seven-winged, but four is general. The petioles are also winged, much enlarged at the base, and stem-clasping.

6. D. *aculeata. Roxb.*

*Tubers* oblong, pendulous, the fibres of the proper roots become spinous. *Leaves* reniform-cordate, acute, from five to seven-nerved.

Cumbilium. *Rumph. Amb.* v. *p.* 357. *t.* 126. one of his varieties thereof is no doubt this very plant; but Katta Kelangu, *Rheed. Mal.* vii. *t.* 37. is too imperfect a figure to be quoted.

A native of Bengal. The roots which are of an oval form, and generally about two pounds, or more in weight, are delicately white, and during the cool season, dug up in the woods, for it is not cultivated, and carried for sale to the market at Calcutta, where they are known to the natives by the name *Mou-aloo*. In habit it resembles much the species I have called D. *fasciculata*, Soosni-aloo of the Hindoos.

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7. D. *fasciculata. R.*

*Tubers* pendulous. *Stems* annual, twining, round; prickles stipulary. *Leaves* alternate, round, cordate, five-nerved.

*Beng.* Soosni-aloo.

This species is cultivated to a considerable extent, in the vicinity of Calcutta, not only for food, but to make starch of the roots.

*Root* consists of many tubers, about the size and shape of a pullet's egg, connected by slender filaments to the base of the stems, covered with a pretty smooth, light coloured, thin integument; internally they are white. *Stems* several, about as thick as a pack-thread, twining round, smooth, except here and there a small prickle, and always two at the insertion of each leaf; these I call the stipules. *Leaves* alternate, long-petioled, round-cordate, entire, pointed, from three seven-nerved, venose, slightly villous.

I have not met with the flowers of either sex. The culture and use of the roots of the various species before and hereafter mentioned, are subjects too well known, to require any thing further from me in this place; my aim is to assist in clearing up the obscurity, in which the valuable plants of this genus have hitherto been enveloped, not only with a view to gratify the Botanist, but to point out marks by which the species may be distinguished by those who are not Botanists. And the best will generally be found in the shape and colour of the root. These are permanent, and by them the Hindoo cultivator is guided; but, I fear, the criticising Botanist may find fault with me for having disregarded the Linnæan rule, which forbids placing confidence in colour. In that case he must consider D. *globosa*, *rubella* and *purpurea*, as varieties of the same species to which he has my hearty consent, if he finds it a more convenient mode, than that which I have followed.

8. D. *pulchella. R.*

*Tubers* roundish, and rather small. *Stems* herbaceous,



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twining, columnar, smooth. *Leaves* profoundly broad-cordate, subulate, pointed, from nine to eleven-nerved, smooth. *Female spikes* axillary, crowded, pendulous.

A native of Chittagong, and so exactly like the following, *crispata*, as to be distinguished from it only by its perfectly smooth, polished, columnar stem and branches, which are perfectly free from every appearance of even an angle or rib. Flowering time in the Botanic garden, the close of the rainy season.

9. D. *crispata. R.*

*Tubers* roundish. *Stems* annual, twining, round, from ten to fifteen-winged; *wings* curled. *Leaves* alternate, broad-cordate. *Female spikes* pendulous; *male* panicled.

A large, elegant species, a native of the interior of Bengal, and introduced by Dr. Carey into the Botanic garden in 1798, where it blossoms during the rainy season.

*Root* tuberous, and small for the great size of the plant, with numerous, ramous, slender fibres issuing from every part thereof. Like potatoes the old roots perish when the new ones are produced, and may be called biennial. *Axillary tubers*, bulbs they are often called, are in this species, both numerous and large, and are proper sets to rear plants from. *Stems* annual, twining, unarmed, round, thick, many fathoms in length, beautifully ornamented with from ten to fifteen parallel, curled wings, otherwise the whole is perfectly smooth. *Leaves* alternate, petioled, broad-cordate, subulate, pointed, from seven to eleven-nerved, with numerous, parallel, anastomosing veins on both sides, from three to nine inches each way. *Petioles* shorter than the leaves, ornamented with parallel, curled wings, like the stems. FEMALE. *Spikes* axillary, crowded, perfectly pendulous. *Bractes* in pairs, unequal, one-flowered. *Flowers* alternate, rather remote, small. *Petals* or *leaflets* of the calyx six, linear, smooth, white. *Stamina*, six erect, short, emarginate, abortive glands. The *capsule* has never come to maturity in this garden.

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10. D. *anguina. R.*

*Tubers* cylindric. *Stems* twining, round, villous. *Leaves* opposite and alternate, cordate, five-nerved. *Male spikes* crowded, pendulous.

*Beng.* Kookoor aloo.

This species I have found in its wild state in woods about Calcutta. Flowering time the close of the rains.

*Tubers* columnar, in a looser soil perpendicular, in a hard one variously bent. *Stems* and *branches* twining up and over trees and bushes, perfectly round, and covered with short soft down. *Leaves* opposite and alternate, petioled, exactly cordate, entire, five-nerved, with many transverse veins between them, from four to six inches long, and from three to five broad. *Female spikes* axillary, erect, long, simple or compound, villous, with remote, small, green, villous flowers. *Calyx* as in the genus.

The root is not much esteemed, though eaten by the poor when hard pressed for food. In shape it agrees with that of *Rumphius's Ubium anguinum, vol.* v. *t.* 122. but the leaves differ much.

11. D. *nummularia. Willd.* iv. 792.

*Tubers* ligneous, irregular. *Stems* twining, perennial, prickly towards the base. *Leaves* opposite, cordate, five-nerved, very smooth on both sides.

*Hind.* and *Beng.* Shora-aloo.

This species I took for D. *oppositifolia* for some time, but on finding some old plants with the stems ligneous, and armed with numerous, sharp prickles, I was convinced it must be a very different species. It is a native of the forests about Calcutta. Flowering time the close of the rains.

*Root* tuberous, but small, and hidden by numerous strong fibres. *Stem* many fathoms long, twining, with the lower part ligneous and prickly, the rest round, and very smooth. *Leaves* toward the base of the stem alternate, all the rest opposite, petioled, cordate, five-nerved, very smooth on both sides,



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glossy on the upper surface. MALE. *Spikes*, or rather *panicles* axillary, very ramous, smooth. *Flowers* numerous, minute. FEMALE. *Spikes* less ramous than in the male, and often simple. *Flowers* few, large, remote.

The root appears to be unfit for food.

12. D. *glabra. R.*

*Tubers* small, sub-fusiform. *Stems* herbaceous, twining, polished and flattened. *Leaves* opposite and alternate, oblong, cordate, acuminate, polished, and somewhat glaucous.

A native of Silhet.

13. D. *heterophylla. R.*

Herbaceous, twining. *Leaves* alternate, the inferior ones sagittate, the superior ones cordate, three or seven-nerved, fine-pointed. *Male spikes* simple.

A native of Pulo Pinang, and the Moluccas. One male plant flowered in this garden for the first time in October and November 1809, after it had been in it ten years.

14. D. *oppositifolia. Willd.* iv. 797.

Herbaceous, smooth. *Leaves* opposite, from cordate to ovate-lanceolate, acute, from three to seven-nerved. *Male flowers* panicled, the *female* ones spiked.

*Teling.* Ava-tenga-tiga.

A native of dry soil, amongst bushes, on the Coromandel coast. Flowering time the rainy season.

*Root* tuberous, perennial. *Stems* twining, slender, round, smooth, annual. *Leaves* opposite, petioled, oval, acute, waved, smooth, from three to seven-nerved. *Male flowers* very numerous on axillary panicles. *Female flowers* few, on axillary spikes.

The roots are eaten by the natives.

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15. D. *tomentosa. Kön. Mss.*

Herbaceous; *tubers* irregularly oblong, twining, downy, slightly armed. *Leaves* alternate, ternate, downy; *male racemes* axillary, compound.

A native of the valleys amongst the mountains of the Circars. It appears during the rains, with the other species of this genus.

*Root* tuberous, perennial, in shape like the common yam. *Stems* twining, armed with a few inoffensive prickles, downy. *Leaves* alternate, ternate, downy, entire. *Petioles* downy, with an inoffensive prickle here and there. *Racemes* axillary, compound, several times longer than the leaves, downy; *spikelets* fascicled, short, closely surrounded with minute, downy flowers. *Bractes* minute, three to each flower. *Calyx* or *corol* six-leaved, expanding. *Stamens* six, shorter than the calyx.

I have not seen the female plant; the above description and the drawing, are from male plants reared in my own garden, at Samulkota. *Roots* succulent, and requiring less care in dressing than those of *Dioscorea triphylla.*

16. D. *dæmona. Roxb.*

*Root* tuberous, biennial. *Stems* annual, twining, armed. *Leaves* ternate; *leaflets* obovate-cuneate, three to five-nerved.

Ubium silvestre, *Rumph. Amb.* v. *t.* 127, is certainly this plant, while I refer D. *triphylla. Willd.* iv, 790. to *Tsjageri nuren, Rheed. Mal.* vii. *t.* 33. a plant well known to me, though I have not yet described nor figured it.

This very distinct species is a native of the Goruckpore forests, as well as of the Moluccas. Plants from both countries are now before me in the Botanic garden at Calcutta, where they thrive well, and blossom about the close of the rains. The root is dreadfully nauseous, even after it has been boiled.

*Root* biennial, tuberous, roundish, variously lobate, with numerous, small, firm fibres, issuing from every part. One

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of two years' growth, which grew in this garden, was rather more than a foot in diameter. *Stem* annual, twining to a very great extent, round, and armed with numerous acute pricklets, otherwise smooth. *Leaves* long-petioled, ternate. *Leaflets*, the middle one cuneate, obovate, the lateral subsemicordate, all are acute, entire, both sides villous while young, from three to five-nerved, various in size, the largest often a foot long, and six inches broad. *Petioles* slightly armed with small prickles, and like the leaves, villous while young. MALE. *Inflorescence; spikes* axillary, compound, drooping, sometimes leaf-bearing; the general length from six to eighteen inches. *Calyx.* The exterior three leaflets round and smaller than the inner three, which are ovate. FEMALE FLOWERS on a different plant. *Spikes* axillary, solitary, pendulous. *Flowers* remote. *Calyx* as in the male. *Germ* beneath, very large, three-sided, villous. *Styles* scarcely any. *Stigmas* three.

17. D. *pentaphylla. Willd.* iv. 789.

*Tubers* oblong. *Stems* herbaceous, twining, prickly. *Leaves* digitate, downy. *Male flowers* panicled, the *female* ones spiked.

*Beng.* Kanta-aloo.

Nuren-kelengu. *Rheed. Mal.* vii. *t.* 34. and 35.

This species I have only found in its wild state; though the root is large, white, and reckoned very wholesome and palatable, and eaten by the natives. Flowering time the rainy season.

*MENISPERMUM. Schreb. gen. N.* 1544.

MALE. *Calyx* six-leaved. *Corol* six-petalled. FEMALE. *Calyx* and *corol* as in the male. *Germs* three, or six, singly one-celled, one-seeded; *attachment* interior. *Berries* three, or six, one-seeded. *Embryo* inverse and furnished with a perisperm.

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1. M. *Columba. R.*

Herbaceous, twining, hairy. *Leaves* sub-rotund, five-lobed; *lobes* acuminate. *Male panicles* axillary, drooping. *Anthers* four-celled.

Columbo, &c. *Asiat. Res.* x. *p.* 385.

Radix Colomba. *M. M. Murray*, iii. 333.

A native of the east coast of Africa in the vicinity of Oiba and Mozambique. One male plant blossomed during the hot season of 1807 in the garden of the late Dr. James Anderson at Madras, and from it Dr. A. Berry took the description which is published in the tenth volume of the *Asiatic Researches.* A fresh offset from the root of that plant was obtained for the Botanic garden at Calcutta, where it was planted in August 1807, and now, August 1812, it remains perfectly fresh, but has never thrown out even a single bud, or shown any tendency to vegetate. However, in April of the same year 1812 Dr. Berry brought with him from the late Dr. Anderson's garden at Madras, the original root, and several of its offsets, which he presented to the Botanic garden. They were immediately put into the ground, and in the course of a couple of months they threw out their hairy, herbaceous shoots to an extent of several fathoms, and blossomed most abundantly during the rainy season. The whole, as they now appear, agree well with Dr. Berry's original description; only I should rather be inclined to call the inflorescence a drooping *panicle*, than a compound *raceme.* In the months of November and December the whole perished down to the root; which on examination, had not only gained considerably in size but each had thrown out, during the season, several pretty large, fusiform tubers, not unlike yellow carrots, the largest of them was eleven inches in circumference, and twenty inches long.

2. M. *Cocculus. Willd.* iv. 825. *Gært. Sem.* i. 219. *t.* 70.

Perennial, twining, scandent. *Leaves* cordate, base truncate, firm and lucid.

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There is no figure in *Rumphius*, or in the *Hortus Malabaricus* that I can quote for this famous plant, nor indeed in any work known to me, except *Gærtner*, above quoted, and that extends only to the fruit. It is a native of Malabar, from thence seeds were sent to the Botanic Garden in 1807; at the close of 1812 the plants were sufficiently large to extend over a large mangoe-tree, with a stout ligneous stem, as thick as a man's wrist, covered with deeply cracked, spongy, ash-coloured bark, that of the young shoots smooth and green. *Leaves* alternate very exactly cordate, entire, apex obtuse, or emarginate, of a hard texture, lucid above, paler but no ways tomentose, or villous underneath, from four to twelve inches long, by from three to eight broad, I cannot say any thing of the natural character, as our plants have not yet blossomed.

3. M. *verrucosum*. *R. Fleming in Asiat. Res.* xi. 171.

Perennial, scandent, bark verrucose; *young shoots* polished. *Leaves* cordate, acuminate, entire, smooth. *Male racemes* from the naked branches, simple. *Nectarial scales* inserted on the filaments.

Funis felleus. *Rumph. Amb.* v. *p.* 82. *t.* 44. *f.* 1.

*Mal.* Putra-wali.

A native of Sumatra, as well as of the Moluccas. From the first mentioned place, Captain Wright brought some plants to Bengal, which he presented to this garden, where they thrive well, and blossom in February and March; but the whole have turned out to be male ones; the female has not yet been seen.

*Stems* and *branches* scandent, and twining, round, much warted. *Young shoots* round and smooth. The plants in two years spread themselves entirely over pretty large trees. When by accident, or otherwise, any of the stems or larger branches, are cut in two, long filiform roots spring from the upper portion, let the distance be ever so great, which quickly descend to, and enter the earth; by this wonderful

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economy the perfectibility of the plant is soon restored. It is the same with *Menispermum cordifolium* and *tomentosum*. Such uncommon care has Nature taken for the preservation of these plants, which must, no doubt, be intended for some purpose, of which we are probably still ignorant.

*Leaves* remote, petioled, cordate, acuminate, entire, smooth on both sides; *lobes* large, and rounded; from four to six inches long, and from three to five broad. *Petioles* columnar, smooth, two thirds the length of the leaves. *Male racemes* one, two, three, or four from the germs of the fallen leaves, over the larger naked branches, simple, round, smooth. *Flowers* generally in pairs on their proper, slender, diverging pedicels; with a small, oval, fleshy bracte at their insertion. *Calyx* six-leaved; *leaflets* ovate, small. *Petals* six, cuneate, inserted on the outside of the filaments, a little above their base. *Filaments* six, expanding. *Anthers* four-sided.

The leaves, indeed the whole plant, is exceedingly bitter, and is employed by the Malays for the cure of intermittent fevers. Captain Wright who first brought it from Sumatra, said it was as powerful a febrifuge, as the Peruvian bark.

4. M. *fenestratum. Gært. Sem.* i. *p.* 219. *t.* 46. *f.* 5.

Shrubby, scandent. *Leaves* cordate, in young plants peltate, entire, from five to seven-nerved, downy underneath. *Inflorescence* in globular umbellets, from the larger woody branches. *Berries* covered with downy bark.

Cingalese synonyms, *Woniwol, venivel,* or *Bangwelgetta.*

A native of Ceylon, where it blossoms during the cool months of November and December; and the seeds ripen in May and June.

*Trunk* and *large branches* scandent, stout, thick, and ligneous. The wood of a deep, lively yellow colour, and of a pleasant bitter taste. *Leaves* alternate, petioled, cordate, entire, five or seven-nerved, smooth and shining above, very



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hoary underneath, sometimes acuminate, sometimes obtuse; generally from three to nine inches long, and from two to six broad. In young plants frequently peltate. *Petioles* shorter than the leaves, round, downy. *Female umbellets*, or heads, from the stout, naked, ligneous branches, several from the same bud, on thick, round, downy peduncles, of about an inch in length. *Flowers* numerous, sub-sessile, villous, of an obscure green. *Bractes* of the umbellets obscure; those of the flowers three or four, reniform, villous, pressing close on the calyx. *Calyx* six-leaved; the three exterior ones oval, small, very downy on the outside, permanent; the three interior ones considerably longer. *Petals*, six small, short, sterile filaments, three embracing the base of the germs, very downy. *Styles* slender, recurved. *Berries*, from one to three come to maturity, nearly round, villous, of the size of a large filbert, each with a single seed, as represented by that excellent and accurate Botanist Gærtner. *Receptacle* of the fruit; while in blossom the flowers are nearly sessile, on a globular receptacle, of the flowers I will call it, but, like the germs in *Uvaria*, as the fruit advances in size, the very short pedicel of the original flower lengthens into a pretty long, stout, cylindric, villous pedicel, ending in a round-headed receptacle, on which sit from one to three berries surrounded with the small permanent calyx and corol.

The above description, was taken from specimens sent to me from Ceylon by General Macdowall, who at the same time gave me the following account of the plant.

"I have lately been at some trouble to discover whether, or not the true *Colombo root* is a native of our soil, and shall probably remain in doubt, until I am furnished with your opinion. I now forward a specimen of the root, and some of the leaves, and flowers, which grow from the stem of the branch. It is a very strong creeper, and the natives make use of it to tie their cattle, and for other purposes of husbandry, where ropes are necessary.

"Should this prove the celebrated *Colombo root*, I believe

a great quantity of it might be collected, and sent to Europe where it is in great request, but I can scarcely presume to think after all the labour of the learned Thunberg in particular, who denies its existence here, that I shall be so fortunate as to discover it. Your opinion shall be decisive with me, and although it may not be that valuable medicine, I suppose it yet may possess many excellent qualities. It is called by the Cingalese Venivel-getta, or Bangwel-getta. English, the knotted plant. It is in repute amongst the inhabitants, who slice it into pieces, and after having steeped it in water several hours swallow it with the liquid. They recommend it as an excellent stomachic.

"When the seed ripens, I shall have the pleasure of sending you some of it at all events.

"I have sent you a pretty large bit of the root, sawed from the centre of a knot, that you, may make an experiment upon it."

*Note.* This is certainly not the *Colombo root* of our *Materia Medica. R.*

5. M. *cordifolium. Willd.* iv. *p.* 826.

Twining with corky, scabrous bark. *Leaves* round, cordate, smooth.

Cit-amerdu. *Rheed. Mal.* vii. *t.* 21.

*Beng.* and *Hind.* Goluncha-luta.

*Teling.* Tippa tiga.

Is one of the most common wild plants in India, every hedge producing it in abundance, and every soil seeming to suit it perfectly well. It flowers most part of the year.

*Root* large, soft and spongy like the China root of the *Materia Medica.*

*Stem* twining, perennial, very succulent, running over the highest trees. *Bark* thick, corky, with many elevated scabrous specks, from the branches there frequently drop filiform fibres, which continue lengthening till they enter the ground, and form additional stems and roots. I have measur-



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ed them thirty feet long, and in no part thicker than a packthread. *Leaves* alternate, petioled, broad-cordate, five-nerved, entire, curved, smooth, about four inches each way. *Petioles* round, smooth, swelled at the base. *Racemes* axillary, or terminal, or from the tuberosities of former leaves, with frequently a few flowers in separate axills. *Flowers* numerous, small, yellow. MALE. *Calyx* six-leaved; *leaflets* oval. *Petals* six, wedge-formed, half the length of the calyx; *margins* inflected and embracing the filaments. *Filaments* six, clubbed, spreading, rather longer than the petals. *Anthers* twin, immersed in the fleshy extremities of the filaments. FEMALE. *Calyx* and *corol* as in the male. *Filaments* six, fleshy, sterile. *Germs* three, superior, resting on a tumid receptacle. *Style* single, very short. *Stigmas* torn. *Berries* one, two, or three, generally one or two, rarely all the three come to maturity, of the size of a small cherry, smooth, red, succulent, with very glutinous pulp, each resting on a tumid receptacle. *Seed* single, kidney-formed, on the inside there is a deep pit, which receives its receptacle.

The fresh root is employed by the natives, in substance, mixed up with sour rice-gruel, and sweetened with sugar, for the cure of heat of urine in gonorrhoea. Birds eat the ripe berries. The seeds are not used in these parts for any purpose that I can discover. To intoxicate fish, and render them easily caught, the natives employ the fruit of *Gardenia dumetorum*, the bark of *Walsura*, and *Phyllanthus virosus*.

6. M. *villosum*. *R.*

Twining, every part soft with down. *Leaves* broad-cordate, five-nerved, entire. *Panicles* axillary, sub-globular.

A large twining perennial; a native of Chittagong, in flower and fruit at different times of the year. The six anthers are of two large round lobes each, with round pores at the top. *Nectarial scales* or rather *petals* sub-cuneiform, fleshy, and emarginate.

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7. M. *tomentosum. Roxb.*

Perennial, twining. *Leaves* three-lobed, tomentose. *Racemes* axillary; *petals* entire.

*Beng.* Pudma-goluncha.

A native of hedges, and thickets, all over Bengal, but by no means common. Flowering time the months of February and March; the seed ripens in May and June.

*Stems* twining up and over trees to a great extent. *Bark* of the older parts ash-coloured, with small, scabrous specks, that of the young shoots downy. Like some other species of this genus, viz. M. *cordifolium*, *Willd.* and *verrucosum*, Funis felleus, *Rump. Amb. v. t.* 44. *f.* 1. tender filaments issue from various parts, which quickly descend into the ground, often from the height of some fathoms. This happens particularly. when the lower part of the original plant has been destroyed, the succulent fragments remaining amongst the branches of the trees they run on, send out those fibres abundantly, some one, or more of which soon replaces the former stem and root. A most wonderful economy for the preservation of these plants. *Leaves* alternate, petioled, of a roundish cordate shape, having the anterior margin generally three-lobed, soft and tomentose on both sides, particularly underneath, from three to five or six inches long, and nearly as broad. *Petioles* round, tomentose, nearly as long as the leaves. *Style* scarcely any. *Stigmas* with enlarged, ragged surfaces and margins. *Berries*, or *drupes*, nearly round, smooth, of the size of a marrowfat pea, from one to three together, when ripe of a deep orange colour. *Seed* solitary, rough, reniform, with a pit on the inside, and a furrowed belt round the exterior or convex side. MALE. *Racemes* generally simple, one, two, or more together from the buds at the axills of the fallen leaves. *Bractes* minute, caducous, many-flowered. *Calyx*, the exterior three leaflets lanceolate, very small; the interior three nearly round, first expanding, then recurved. *Petals* oval, entire, with the posterior margins incurved over the base of the filaments. *Filaments*

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clavate. *Anthers* two-lobed. *Pistil* none. FEMALE FLOWERS on a different plant. *Calyx*, the three exterior leaflets minute; and the three interior ones roundish, many times larger than the former. *Petals* six, ovate-oblong, entire. *Stamens* none, but six, short, fleshy filaments, scarcely half so long as the petals. *Germs* three, elevated on a hemispheric receptacle. *Berries* as in the former species.

It differs from Thunberg's *Menispermum trilobum*, in having the petals or scales of the nectary entire, and the interior three calycine leaflets spreading; whereas in M. *tribolum*, the former are said to be split at the apex, and the corol campanulate.

8. M. *hirsutum*. *Willd.* iv. *p.* 829.

Shrubby, twining, from broad-cordate, to linear-cordate, downy. *Male flowers* racemed; *female* axillary, solitary.

*Hind.* Hier or Dier.

Wal-tiedde. *Gært. Sem.* ii. *t.* 180.

This is the only species I have yet met with, that I can compare with M. *myosotoides*. Can they be the same?

Cocculus indicus foliis aristolocheæ subtus lanuginosis, fructu minore. *Pluk. Alma.* 61. *t.* 384. *f.* 5. agrees better with my plant than either *fig.* 7 or 3. of the same table.

*Teling.* Doosra tiga.

A common twining species, found in most hedges. It flowers during the wet season.

*Stem* woody, but slender, and twining. *Leaves* alternate, short-petioled, narrow-cordate, or ovate, three-nerved, covered with much soft down, about one or two inches long, and broad in proportion. MALE. *Racemes* terminal, filiform, interrupted, leafy. *Calyx* six-leaved. *Petals* six, linear, emarginate. *Stamens* as in M. *cordifolium*, only shorter. FEMALE. *Peduncles* solitary, one-flowered. *Calyx* and *corol* as in the male. *Germs* three, each semi-ovate, one-celled, containing one ovulum attached to the middle of the inside of the cell. *Berries* from one to three, one most common,

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nearly round, of the size of a small pea, marked on the inside near the base with the remaining stigma, smooth, when ripe of a black purple, and full of deep purple juice. *Seed* solitary, nuciform, forming nearly a complete ring with the joining on the inner and under side, between the stigma, and insertion of the peduncle. *Integuments* three; the *exterior* one rugose, and consisting of four valves, which fall off spontaneously in as many portions, if the pulp has previously been removed, if not, they adhere to it, and are separated with it in the dry state, exposing the middle, white, rugose, two-valved, nuciform tunic, which has a large perforation in the middle; the *inner* one very thin, and adhering to the perisperm. *Perisperm* conform to the seed, and of a light brown colour. *Embryo* inverse, annular. *Cotyledons* two, lanceolate. *Radicle* curved, with its apex opposite to the stigma.

The juice of the ripe berries makes a good, durable, bluish purple ink. A decoction of the fresh roots, with a few heads of long pepper, in goats' milk, is administered for rheumatic and old venereal pains; half a pint every morning is the dose. It is reckoned heating, laxative, and sudorific.

The fresh leaves taste simply herbaceous. Rubbed in water they thicken it into a green jelly, which is sweetened with sugar, and drank when fresh made, to the quantity of half a pint, twice a day for the cure of heat of urine in gonorrhoeas. If suffered to stand a few minutes, the gelatinous or mucilaginous parts separate, contract and float in the centre, leaving the water clear like Madeira wine, and almost tasteless. Curry is made of the leaves, for people under a course of the roots, or jelly of the leaves. Goats, cows, and buffaloes eat it.

9. M. *laurifolium. R.*

Arboreous. *Leaves* lanceolar, lucid, entire, three-nerved. *Male* and *female flowers* on compound, axillary racemes.

*Beng.* Pudma-goluncha.

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Found by Captain Hardwicke, in the vicinity of Dosa, in his journey to Shreenagur, in flower in April.

10. M. *hexagynum. R.*

Twining, villous. *Leaves* parabolic. *Female panicles* axillary, and terminal; *flowers* with six germs, six bifid petals, and abortive stamina.

A native of China. In flower the whole year in the Botanic garden. Except *laurifolium*, which is arboreous, the whole of the foregoing species are permanent, scandent or twining plants, of very considerable extent.

11. M. *triandrum. R.*

Shrubby, twining. *Leaves* ovate, oblong, pointed, smooth. *Male flowers* triandrous, with an urceolate, three-petalled corol.

A native of Pulo Pinang; seed sent from thence, produced one *male plant* in this garden, which is now ten years old, and blossoms during the rains. The *female plant* has not yet been seen.

*Stem* none, but many twining, or spreading branches, with smaller flower-bearing ones from their base near the ground, smooth, of a deep green in every part. *Leaves* alternate, short-petioled, ovate-oblong, pointed, entire, smooth on both sides; from two to three inches long. MALE. *Racemes* axillary, one or more together, rather longer than the petioles. *Flowers* numerous, very minute, yellow. *Calyx* six-leaved, the exterior ones minute, the interior three pitcher-shaped. *Filaments* three, wedge-shaped, thick and fleshy, erect, converging. *Anthers*, two pits in the apex of each filament.

12. M. *polycarpon. R.*

Shrubby, twining to a great extent. *Leaves* cordate, ovate, smooth. *Berries* as many as twelve, short-pedicelled.

*Hind.* Baga-mushada.

*Beng.* Tiliakora.

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*Teling.* Tiga-mushadee.

A large, twining, woody shrub, found in most parts of the coast of Coromandel, and in Bengal, though not abundantly. It grows chiefly in hedges, and in places overrun with bushes. It flowers most part of the year.

*Stem* woody, twining to a great extent. *Bark* ash-coloured. *Leaves* alternate, petioled, cordate, pointed, smooth, shining, and frequently scolloped, about five inches long, and three broad. *Racemes* axillary, erect, in the male frequently compound, in the female simple, erect, bearing but few flowers. *Bractes* minute, caducous. *Flowers* small, yellow. MALE. *Calyx* nine-leaved; the three exterior ones small. *Petals* six, obcordate, clawed, about the size of the calyx. *Filaments* six, subulate, erect, alternately shorter, of the length of the corol. *Anthers* oval. FEMALE. *Calyx* and *corol* as in the male. *Germs* superior, about twelve in a circle, each ending in a short, subulate style. *Stigmas* simple. *Drupes* or *berries* many, short-pedicelled, ovate, smooth, red, about the size of a French bean. *Nut* one, or two-celled.

Birds eat the berries. Cattle eat no part of it.

This is the third sort of *Mushadee* of the Telingas.

The first is Mushadee, *Nux vomica* tree. The second is *Naga Mushadee*, or snake wood tree, both already described; the root of this sort is also used for the cure of the bites of venomous snakes. It is rubbed between two stones, and given as a drink, mixed with water. However, the natives themselves confess they have very little opinion of its virtues.

13. M. *heteroclitum. R.*

Shrubby, twining. *Leaves* cordate. *Male flowers* panicled, monadelphous. *Calyx* two-leaved, corol six-petalled.

A native of the Circars.

*Stem* thick, woody, twining or climbing. *Bark* cracked, ash-coloured. *Leaves* alternate, petioled, cordate, entire, above smooth, of a deep shining green, whitish below, three or five-nerved, from four to six inches each way, with many small



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distinct tufts of hair upon the nerves on the under side. *Petioles* round, smooth, as long as the leaves. *Panicles* from the naked woody parts of the stem, and large branches, drooping beautifully. *Bractes* three-fold, one-flowered, small, caducous. MALE. *Calyx* two-leaved; *leaflets* opposite, oval. *Petals* six; the three interior ones equal, oval. *Stamens*, in the centre is a short thick column, supporting a great number of anthers, in the form of a globe. FEMALE. *Calyx* and *corol* as in the male. The rest as in M. *cordifolium*. The female flowers have not been found. *Berries* as in the genus, about the size and colour of a ripe black cherry, and as they are collected in very large, pendulous bunches, their appearance is inviting, but their taste is most abominable.

## DIOECIA ENNEANDRIA.

### *TETRANTHERA. (Tomex. Thunb.)*

*Nat. ord. Lauri. Juss.*

*Involucre* four or five-leaved, few-flowered. MALE. *Calyx* one-leaved, entire, or from three to six-parted. *Corol* none. *Nectarial glands* various. *Anthers* four-celled. FEMALE. *Germ* superior, one-celled, one-seeded, superior. *Berries* one-seeded. *Embryo* inverse, without perisperm.

1. T. *nitida. R.*

*Leaves* short-petioled, sub-cuneiform, obtuse, shining. *Racemes* axillary, short. *Involucre* four-leaved, five-flowered. *Calyx* from three to six-cleft. *Nectary*, in the female corollets, alternately sagittate-cordate, and subulate. *Male* enneandrous. *Berries* oblong.

Kintoni-jam is the vernacular name in the neighbourhood of Silhet, where it is indigenous, and grows to be a useful timber tree, of very great size, and in the more remote forests which cover the Garrow hills, so large as to admit of being made into

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canoes of full fifty feet in length, for which purpose this tree is preferred. Flowering time July and August; the seed ripens in April.

*Young shoots* smooth and glossy. *Leaves* alternate, short-petioled, of a lanceolar, cuneiform shape, obtuse, entire, firm and glossy, from five to eight inches long, and two broad. *Racemes* axillary, and from the leafless branchlets of the former year, short, few-flowered. *Pedicels* alternate, each ending in a minute umbellet of five corollets, embraced by an involucre of four, or rarely five, round, concave, smooth leaflets. *Calyx* with a hairy campanulate base, and six-parted border. *Corol* none. MALE. *Filaments* generally longer than the calyx, woolly, and disposed as in the *Lauri*. *Nectarial glands* alternate with the stamina, pedicelled, headed, and woolly. *Germ* none. FEMALE. *Nectarial bodies* alternately broad-cordate-sagittate, and subulate, but very irregular in shape and number. *Stamina* none. *Germ* superior, embraced by the bell of the calyx, one-celled; ovulum single, attached to the top of the cell. *Style* the length of the calyx. *Stigma* simple. *Berries* oblong, smooth, succulent, of the size and appearance of those of *Laurus Cinnamonum*, one-celled. *Seed* simple, long-ovate. *Integuments* two; the *exterior* one light brown, and of the texture of parchment; the *inner* one membranaceous. *Perisperm* none. *Embryo* inverse, as in the *Lauri*.

2. T. *apetala*. *Corom. pl.* ii. *N.* 147.

*Leaves* from oval to lanceolate. *Involucres* four-leaved, from eight to twelve-flowered. *Calyx* scarcely any. *Stamens* about fourteen.

*Tomex sebifera*. *Willd.* ii. *p.* 840.

Gaja-pippali. *Asiat. Res.* iv. *p.* 303.

Laurus *involucrata*. *König's Mss.* and *Retz. Obs.* vi. *p.* 27.

Sebifera *glutinosa*. *Lourier. Cochin. Ch.* 783.

*Teling.* Narra-alagi.



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*Beng.* Kookoor chita.

This grows to be a middle sized tree, is a native of the mountainous parts of the Circars. *Flowers* in June, when the rains begin.

*Leaves* scattered near the extremities of the branchlets, petioled, oval, obtuse, smooth, above shining, from three to five inches long, and from two to three broad. *Petioles* about an inch long, round, smooth. *Stipules* none. *Peduncles* solitary, axillary, as long as the petioles, three or four-cleft.* *Pedicels* rather shorter than the peduncles, clubbed, each supporting a small head or umbellet of minute flowers. *Bractes*, a small one at the insertion of each pedicel. MALE. *Involucre* four-leaved, containing from eight to twelve pedicelled corollets. *Leaflets* orbicular, concave, caducous. *Perianth* none. *Calyx* campanulate; *border* an exterior rim into which the stamina and nectarial glands which surround the germ are inserted. *Anthers* four-lobed, four-celled, with an oval lid to each cell. *Nectarial glands* from six to sixteen, short-pedicelled, oval, peltate, alternate with the filaments, but three times shorter. *Germ* none, or small, and abortive. FEMALE FLOWERS on a separate tree. *Umbellets*, *involucre* and *calyx* as in the male. *Stamens*, the hairy filaments, but instead of anthers there are oblong white glands. *Nectarial glands* as in the male. *Germ* superior, globular, one-celled, containing one ovulum attached to the top of the cell, as in the *Lauri*, to which order it belongs. *Style* twice the length of the filaments. *Stigma* torn. *Berry* globular, smooth, black when ripe, and almost dry, one-celled, of the size of a pea, resting on the clubbed pedicel, as on a cup like the acorn. *Seed* one, globular. *Embryo* inverse, and without perisperm, as in the *Lauri*.

* In Bengal, where the tree is common, and its growth luxuriant, the peduncles in the male tree, are numerous about the ends of the branchlets, and frequently racemed, bearing from ten to fifteen flowers.

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*Note.* Dr. Berry of Madras informs me that this is the tree which Dr. Klein of Tranquebar named after him, (*Berrya Chinensis. Willd. ed. sp. pl.* ii. 840.)

3. T. *monopetala. R. Corom. pl.* ii. *N.* 148.

*Leaves* oblong, downy underneath. *Involucres* five-leaved, five to six-flowered. *Calyx* five-cleft.

*Beng.* Bura Kookoor chita.

*Teling.* Nara mamoodee.

Tomex *japonica. Thunb. Jap.* 190. *Willd.* ii. 839.

Kutmoreea, and Pupreea. *Asiat. Res.* vi. *p.* 377-8.

*Apetala* and *monopetala* are both small, handsome, evergreen trees; common on the coast of Coromandel, and Bengal, flowering in May and June.

4. T. *quadriflora. R.*

*Leaves* lanceolar, smooth. *Peduncles* axillary, few, long and distinct; *involucre* four-leaved, four-flowered; *corollets* enneandrous; *calyx* six-parted. *Berries* ovate-oblong.

Sowaree, the vernacular name in the Silhet district, where it is indigenous in the extensive forests which skirt the Garrow hills, and there grows to be a small, ramous tree; blossoming about the end of the cool season in February, and the seed ripening during the rains. It differs from *lanceæfolia* in the *umbellets* being fewer, and long-peduncled; in that they are sub-sessile and crowded. *Branches* and *branchlets* smooth, straight, and spreading but little. *Leaves* alternate, petioled, lanceolar, entire, smooth on both sides, glaucous underneath; from four to six inches long, by one or two broad. *Petioles* about an inch long, smooth, slightly channelled. MALE. *Umbellets* axillary, generally from six to eight in the same axills, long-peduncled. *Peduncles* villous. *Involucre* four-leaved, four-flowered; *leaflets* oval, concave, five-nerved, villous. *Calyx* from five to six-parted, six is the most frequent; *segments* oblong, alternate, rather larger, villous. *Corol* none, except the *calyx* be so called. *Filaments* ge-

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nerally nine, longer than the petals, villous, arranged exactly as in the *Lauri*, viz. a vertical pair under the three larger exterior segments of the calyx, with two large sub-pedicelled glands on the base of the lower three, and a single unappendaged one between the three hairs, on the base of the three smaller and inner segments of the calyx. *Anthers* four-celled. *Germ* an abortive column, with a larger three-lobed apex. FEMALE. *Umbellets*, *involucre*, and *calyx* as in the male. *Berries* of the size and shape of a very small olive, and much like those of the cinnamon, resting on the permanent base of the calyx, one-celled. *Seed* solitary, of the shape of the berry. *Perisperm* none. *Embryo* inverse, as in the other *Lauri*.

5. T. *macrophylla. R.*

Arboreous. *Leaves* oval, villous underneath. *Umbellets* in lateral and axillary fascicles; *involucres* from four to six-flowered; *corollets* decandrous; *calyx* six-parted. *Berries* oblong.

*Sooria*, the vernacular name in the Silhet district, where it grows to be a middling sized, very ramous, ever-green tree; on its leaves the *Mugadootee* silk-worm feeds. Flowering time the hot season, chiefly April; the seed ripens in August.

6. T. *lanceæfolia. Roxb.*

Shrubby. *Leaves* lanceolar, entire, glossy, glaucous underneath. *Umbellets* axillary, and lateral, crowded, sub-sessile. *Involucre* four-leaved, from four to five-flowered. *Corollets* enneandrous. *Calyx* six-parted. *Berries* oblong.

Bun-mool, the vernacular name in Silhet, where the shrub is indigenous in the forests. Flowering time March and April; and the seed ripens in June.

*Young shoots* smooth. *Leaves* alternate, short-petioled, lanceolar, entire, one-nerved, glossy above, glaucous underneath; from three to four inches long, by one broad. *Sti-*

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*pules* none. MALE. *Umbellets* axillary, but chiefly under the leaves from the old axils, crowded, short-peduncled, but appearing in sessile heads, many being crowded together, small, of a dull yellow. *Involucre* four-leaved, from four to five-flowered; *leaflets* round, concave. *Calyx* or *perianth proper* one-leaved, six-parted, exactly as in *Laurus*. *Filaments* nine exterior, and simple, from the base of the segments of the calyx, and three interior, or rather inferior, from its tube; these have the glands of the *Lauri;* all are hairy. *Anthers* four-celled. *Germ* none. FEMALE. *Umbellets* as in the male. *Berries* oblong, of the size of a field bean, black, smooth, succulent, one-celled, seed solitary, conform to the berry. *Perisperm* one. *Embryo* inverse. *Cotyledons* conform to the seed. *Radicle* superior, and considerably within the apex of the cotyledons.

7. T. *laurifolia. Jacq. Hort. Schoenb.* i. *p.* 59. *t.* 113.

*Leaves* cuneate, obovate, obtuse, smooth.

Tomex *Tetranthera. Willd.* iv. 839.

A small tree, a native of Bengal. It blossoms in May and June, and the seed ripens about the close of the rains.

8. T. *fruticosa. R.*

Shrubby. *Leaves* lanceolar, glossy, and glaucous underneath. *Racemes* axillary, and lateral. *Involucre* four-leaved, five-flowered; *corollets* enneandrous, with a six-cleft calyx. *Berries* oblate.

Oaoa, the vernancular name in Silhet, where it is found. It is an upright ramous shrub, of about six feet in height, growing in the forests, where it flowers in June and July, and the berries ripen the ensuing cool season.

*Leaves* alternate, short-petioled, lanceolar, firm, and glossy, glaucous underneath; from six to twelve inches long, by from two to three broad. MALE. *Racemes* axillary, and solitary, or more numerous from the former year's branchlets below

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the leaves; a little umbellet of five minute florets in a four-leaved involucre. *Bractes* lanceolate, downy, caducous, one under each pedicel. *Calyx* proper, six-cleft, exactly as in the *Lauri*. *Corol* none. *Stamina* also as in that order, only there are no glands alternate with the lower and inner three. *Germ*, a slender, abortive column. FEMALE. *Racemes*, *umbellets*, and *involucre* as in the male, but shorter. *Calyx* as in the male, but the segments are deciduous, and the base, or undivided part, permanent. *Germ*, as in the other species already described. *Berries* of the size of a pea, rather oblate, smooth, shining, of a dark purple when ripe, one-celled. *Seed* solitary, conform to the berry. *Integument* single. *Embryo* inverse, no perisperm.

9. T. *pentandra. R.*

*Leaves* lanceolar, triple-nerved, smooth; *umbellets* axillary; *involucres* four-leaved, five-flowered; *corollets* pentandrous.

*Teling.* Nara.

Laurus involucrata. *Corom. pl.* ii. *N.* 187.

A middling sized tree, a native of the Circar mountains; where it blossoms in the cold season, and the seed ripens in April. Every part smells strongly of camphor.

## DIOECIA DECANDRIA.

### *CARICA. Schreb. gen. N.* 1536.

MALE. *Calyx* scarcely any. *Corol* five-cleft, funnel-shaped *Filaments* on the tube of the corol, alternately shorter. FEMALE. *Calyx* five-toothed. *Corol* five-petalled. *Stigmas* five. *Berry* one-celled, many-seeded.

C. *papaya. Willd.* iv. 814.

Lobes of the leaves sinuous.

Papaja. *Rumph. Amb.* i. *t.* 50.

*Beng.* Papeya.

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Papaw tree of the English.

The description of this plant in the *Genera Plantarum* is perfectly exact. It is cultivated in gardens all over India, for the sake of its fruit, which is used both green and ripe. When green they are used in curries by the natives, also pickled and made into a preserve. When ripe the interior, soft, yellow pulpy part is generally eaten without the addition of pepper and sugar, as in the West Indies; many like them much, and they are esteemed innocent and wholesome. It is likely that in this country they may be of a superior quality to those of the West Indies.

I made some experiments in the years 1790 and 1791, to determine whether the female would bear, and ripen its fruit without the male, for which I reared a number of young trees in a garden situate at least a mile and a half from any other Papaw tree; as soon as they showed their flower buds, I could easily distinguish the male, and destroyed them all; nine females were left. They grew most luxuriantly, being in a good soil and well watered, blossomed as usual, and the fruit grew till it was about half the usual size; then or before they uniformly fell off without appearing to have more than the rudiments of seeds. In this manner they continued to blossom and produce half-grown fruit for fully one year, without producing one that came to maturity. I was then perfectly satisfied with the success of my experiment, and caused some male plants to be planted among them; as soon as they had flowered, my female plants began to produce large ripe fruit, their seeds came to the usual maturity, and grew readily.

The Linnæan sexual system did not want additional proofs of its being established on the most solid foundation, otherwise the above related experiment is a very strong one. I know of no tree, or plant, so well adapted, to ascertain the necessity of the male being so situate, as to insure the influence of its flowers on those of the female, to render them fertile. Since writing the above Major Wynch informed me



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that when he commanded at Chicacole there were in his garden two female trees that bore abundantly; there was one male tree standing between them; he had often heard that the female tree would not bear without the male, but did not entirely credit the report. To satisfy himself he cut down the male tree and there was no other near, he thinks not within a mile or two; the consequence was, that from that time neither of the female trees produced ripe fruit, except the few that he thinks might have been formed before he cut down the male tree. December 1793, some specimens of a male tree with fruit on them, were shown me by Sir William Jones, I have not seen the tree, and it is the only instance that has come to my knowledge, where female or hermaphrodite flowers were found on the male Papaya tree. 1609. Since writing the last paragraph another instance of the male tree producing fruit occurred in the Botanic garden. I am informed that the same is common at Malacca.

## DIOECIA ICOSANDRIA.

### *ROTTLERA. R.*

MALE. *Calyx* from two to five-parted. *Corol* none. FEMALE. *Calyx* from four to five-cleft. *Corol* none. *Germ* superior, from two to four-celled; *cells* one-seeded; *attachment* interior. *Capsules* from two to four-coccous. *Embryo* inverse and furnished with a perisperm.

1. R. *tetracocca. R.*

*Young shoots* ferruginous. *Leaves* long-petioled, cordate, rarely lobate, acuminate, hoary underneath. *Panicle* terminal. *Capsules* hoary, papillose, tetracoccous.

Marleya is the vernacular name in the Silhet district, where it grows to be a useful timber tree, of considerable size. It flowers in April and May; and the seeds ripen in August.

*Young shoots* densely clothed with stellate pubescence,

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which is at first ferruginous, but by age gets hoary. *Leaves* alternate, long-petioled, cordate, tending to be peltate in young plants, rarely lobate, generally a little repand, acuminate, when young somewhat ferruginous, when full-grown smooth, of a deep green above, and hoary underneath, with two flat oblong glands at the base, from six to twelve inches long, and from four to eight broad. *Stipules* minute. *Panicles* terminal, *male* and *female* ones on distinct trees, composed of several simple branches, which in the male are much longer. MALE FLOWERS numerous, small, collected in small sessile heads over the branches of the panicles. FEMALE FLOWERS larger, and distinct. *Calyx* in both four or five-parted, *Corol* none. *Filaments* in the male very numerous. *Anthers* twin, in the female none. *Germ* roundish, generally four-celled, each cell containing a single ovulum, attached to the top of the axis. *Styles*, or *stigmas* four, or one for each cell of the germ, spreading, brown and shaggy. *Capsule* of the size of a small gooseberry, a little flattened, hoary, and papillose, generally four-celled, four-valved. *Seed* solitary; the *exterior* integuments smooth, of a shining black, thick and hard. *Perisperm* and *embryo* as in the order *Euphorbiæ*.

2. R. *tinctoria*. *Willd.* iv. 823. *R. Corom. pl. vol.* ii. *No.* 168.

Arboreous. *Leaves* alternate, ovate-oblong, three-nerved, with two glands at the base. *Panicles* axillary and terminal. *Capsules* tricoccous, covered with coloured farina.

*Sans.* and *Beng.* Poonnag.

*Teling.* Wusuntagundha or vusuntagundha.

Ponnagam. *Rheed. Mal.* v. *t.* 21.

A native of Coromandel. Flowers in the cold season.

The red mealy powder, which covers the capsules is used by the natives to dye scarlet, and in Bengal the root is said to dye red also.

Compare with *Croton coccineum*. *Willd.* iv. 544.



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3. R. *peltata. R.*

Arboreous. *Leaves* long-petioled, cordate, peltate, acuminate, downy. *Racemes* terminal, and lateral, solitary. *Capsules* covered with villous filaments.

Seergoollua, the vernacular name in Silhet, where it grows to be a middling sized tree. It flowers in April and May, and the seed ripens in August.

*Young shoots* clothed with much pretty long, soft, light gray, diverging pubescence. *Leaves* alternate, long-petioled, subcordate, peltate, long ensiform-pointed, three-nerved, downy on both sides; from four to eight inches long, by three to six broad. *Stipules* subulate, villous. *Racemes* terminal, and lateral, solitary, simple, longer than the leaves, male and female alike in form and size, but on different trees. *Calyx* in both four or five-cleft; *segments* lanceolate, downy. *Corol* none. *Stamina* in the male numerous; in the female none. *Germ* three-lobed, filamentose, three-celled; *ovula* solitary, attached to the middle of the axis. *Styles* three-fourths three-cleft, segments hairy. *Stigmas* simple. *Capsules* depressed, three-lobed, of the size of a small gooseberry, covered with pretty long, hairy filaments, three-celled, six-valved, opening from the apex. *Seed* solitary, globular, of the size of a grain of black pepper. *Integuments* single, hard, pretty thick, but brittle, of a chesnut-brown colour, and highly polished. *Perisperm* conform to the seed, white, hard and waxy. *Embryo* transverse. *Cotyledons* two, oval, three-nerved. *Radicle* on the outside, opposite to the umbilicus, or attachment of the seed to the upper end of the axis. This position differs from every other of this order, *(Euphorbiæ)* of Jussieu, which I have yet examined.

4. *R. ferruginea. R.*

Arboreous. *Leaves* alternate, from cordate to deeply three-lobed, clothed with ferruginous, stellate pubescence underneath. *Panicles* terminal. *Capsules* tricoccous, villous.

Tanarius minor. *Rumph. Amb.* iii. *p.* 190.

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Croton *gossypifolium*, *Vahl. Symb.* ii. 98. *t.* 49, is much like the male, and the female is labelled a *Ricinus* in the Banksian Herbarium.

A native of the Malay Islands. The male plant flowers during the hot season in the Botanic garden at Calcutta.

5. *R. alba. R.*

Arboreous. *Leaves* alternate, long-petioled, cordate, somewhat peltate, and slightly scollop-dentate, hoary underneath. *Panicles* terminal. *Capsules* villous, armed with villous filaments.

A native of Prince of Wales' Island. It flowers in the Botanic garden during the rains and the beginning of the cool season.

6. *R. dicocca. R.*

Scandent. *Leaves* round-cordate, alternate, three-nerved. *Racemes* terminal, and axillary. *Capsules* dicoccous.

Aleurites *laccifera. Willd.* iv. 590.

*Teling.* Kanda-veltoo.

*Hind.* Akoos.

A native of various parts of India. It is a weak, though large, sub-scandent shrub. Flowering time the hot season; the seed ripens in the rainy season.

7. R. *hexandria. R.*

*Leaves* alternate, long-petioled, rhomb-cordate, cuspidate. *Stipules* ensiform. *Male panicles* axillary, bearing heads of hexandrous flowers.

A native of the Malay Archipelago, and has a great deal of the habit of *Rottlera alba.*

## *GELONIUM. Gært.*

MALE. *Calyx* five-leaved. *Corol* none. FEMALE. *Calyx* five or six-leaved. *Corol* none. *Germ* superior, two or three-celled; *cells* one-seeded; *attachment* superior. *Capsule*

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two or three-celled. *Seeds* solitary, arilled. *Embryo* inverse, and furnished with a perisperm.

1. G. *bifarium. Willd.* iv. 831.

*Leaves* entire. *Capsule* two-celled. *Stamina* about fifteen.

Of this elegant small tree, I have only met with two in the Company's Botanic garden, one of them bears male, and the other female flowers, during the months of February and March. The buds are incrusted with yellow resin.

*Trunk* straight, as yet small. *Branches* numerous, spreading; *branchlets* bifarious, the whole forming a very regular, oval head. *Bark* of a very light ash colour, and smooth; the height of the trees about thirty feet. *Leaves* alternate, short-petioled, bifarious, oblong, perfectly entire and very smooth on both sides, permanent. *Stipules* small, obtuse. *Flowers* small, yellow, several on a very short common peduncle opposite to the leaves, each supported by its own proper pedicel, in the male most numerous. *Bractes* some very small ones at the base of the pedicels, these as well as the stipules, flower-buds, and germs, have frequently small bits of a yellow resin adhering to them. MALE. *Calyx* five-leaved; *leaflets* unequal, orbicular, concave, permanent. *Corol* none. *Filaments* about five, as long as the calyx, inserted into a glandular, convex receptacle. *Anthers* oval, two-lobed. FEMALE FLOWERS on a different plant. *Calyx* as in the male. permanent. *Corol* none. *Nectary* a large, crenulated, yellow ring surrounding the base of the germ. *Germ* superior, two-lobed, two-celled, with one ovulum in each cell attached to the top of the axis. *Styles* scarcely any. *Stigma* four-lobed. *Capsule* dicoccous, fleshy, smooth, yellow, two-celled, two-valved. *Seeds* solitary, round, enveloped in an entire, juicy, white aril. *Integuments* besides the aril two; the *exterior* one brown, smooth, and brittle; the *inner* one membranaceous. *Perisperm* conform to the seed, pure white, amygdaline. *Embryo* inverse. *Cotyledons* often as large as the perisperm, round.

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*Note.* This is nearly allied to Gærtner's *Gelonium cupanoides*, and I conjecture they must belong to one family. My *Suragada glabra*, now *Gelonium fasciculatum*, must, no doubt, be referred to the same genus.

2. G. *lanceolatum. Willd.* iv. 832.

Lanceolar, entire. *Flowers* crowded, but distinct. *Stamina* numerous. *Capsules* tricoccous.

A native of Bengal, where it grows to the size of a small, very ramous tree. It flowers during the hot season, in April and May chiefly. The seed ripens in the cool season.

*Trunk* straight to the top of the tree. *Branches* numerous down to the ground, diverging. *Branchlets* alternate, bifarious. *Bark* of the old, woody parts, ash-coloured, of the young shoots smooth, and green. *Leaves* alternate, bifarious, very short-petioled, lanceolar, obtuse, entire, though in young luxuriant plants they are sometimes serrate near the apex, of a firm texture, and polished on both sides; from one to six inches long, and about one-third as much in breadth. *Stipules* very short, reniform, resinous; when they fall a strong mark like an articulation is left. MALE FLOWERS pedicelled, many together, but distinct, leaf-opposed, small, yellow, delightfully fragrant. *Calyx* of five, unequal, oval, concave, sub-ciliate leaflets. *Corol* none. *Filaments* numerous, longer than the calyx, inserted on a hemispheric receptacle, their insertions intermixed with numerous yellow glands, with ragged apices. *Anthers* ovate. *Pistillum* none. FEMALE FLOWERS short-pedicelled, crowded, opposite to the insertions of the leaves, small, of a greenish yellow. *Calyx* five-leaved. *Corol* none. *Nectary*, a yellow, five-lobed, membranous ring round the base of the germ. *Germ* round, three-celled, with one ovulum in each cell, attached to the top of the axis. *Style* none. *Stigmas* three, recurvate, bifid, and ragged. *Capsule* the size of a small cherry, rather fleshy, when ripe yellow, tricoccous. *Seeds* solitary, enveloped in a white, fetid aril. The other parts almost exactly as in the *Euphorbiæ*, viz. a fleshy perisperm and inverted embryo.

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3. G. *fasciculatum. R.*

*Leaves* oblong, near the apex serrate. *Flowers* fascicled. *Capsules* tricoccous. *Stamina* numerous.

*Hind.* Bun naringa.

*Teling.* Soora gada.

This is rather a small tree, a native of the Circar mountains and Bengal. It flowers in March and April. The buds are covered with a transparent, soft, resinous exudation.

*Leaves* alternate, very short-petioled, oblong, entire, or serrate toward the apex, smooth, shining, firm, from four to six inches long, and about two broad. *Stipules* within the leaves, spathiform, as in the *Gardeniæ*. When they drop they leave a permanent circular mark. *Umbellets* leaf-opposed, few-flowered. *Flowers* yellow, very fragrant. *Bractes* small, caducous. MALE. *Calyx* five-leaved; *leaflets* spreading, orbicular, concave. *Corol* none. *Filaments* numerous, as long as the calyx, inserted into a yellow, glandular receptacle. FEMALE. *Calyx* six-leaved; *leaflets* obovate. *Corol* none. *Nectary*, a yellow, glandular, angular ring, surrounding the base of the germ. *Germ* superior, ovate, three-celled, with one ovulum in each, attached to the top of the axis. *Capsule* nearly round, fleshy, yellow, smooth, three-celled, three-valved. *Seeds* solitary, attached by the inside of the apex of their soft fleshy aril, to the top of the axis, or receptacle. *Perisperm* white, and fleshy. *Embryo* inverse. *Cotyledons* round-cordate. *Radicle* superior.

## DIOECIA POLYANDRIA.

### † *LACOURTIA. Schreb. gen. N.* 1546.

MALE. *Calyx* five-parted. FEMALE. *Calyx* as in the male. *Corol* none. *Germ* superior, five-celled. *Cells* two-seeded; *attachment* interior. *Berry* few-seeded. *Embryo* furnished with a perisperm, and centripetal radicle.

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1. F. *inermis. Roxb.*

Arboreous, unarmed. *Leaves* oblong, crenate-serrate, polished. *Racemes* axillary, short. *Flowers* hermaphrodite. *Style* five-cleft.

*Mal.* Tomitomi.

A native of the Moluccas, where the tree is cultivated for its edible fruit. It has lately been introduced into the Botanic garden, where the tree thrives well, and blossoms during the dry season. The fruit ripens towards the close of the rains.

*Trunk* short, soon dividing into numerous branches which form a large, very dense head of great beauty. The *bark* smooth, brownish, and perfectly destitute of every thing like thorns or prickles. *Leaves* alternate, short-petioled, elliptic, smooth, of a shining green on both sides; when they first expand, reddish, and then the tree is uncommonly gaudy, from three to six inches long. *Petioles* semi-cylindric. *Stipules* none. *Racemes* axillary, longer than the petioles, few-flowered. *Pedicels* clavate, jointed near the middle. *Bractes* ovate, caducous. *Calyx* deeply four or five-parted; *divisions* reniform, shorter than the stamens and pistil. *Corol* none. *Filaments* about twenty, inserted on a fleshy nectariferous ring, which surrounds the base of the germ. *Anthers* two-lobed. *Germ* ovate, five-celled, with two ovula in each, attached to the middle of the axis. *Style* five-cleft, spreading. *Berry* of the size and appearance of a red cherry, and like that fruit, very smooth. *Seeds* as far as ten, in five vertical pairs, much compressed, ovate, covered with a rough nuciform integument. *Perisperm* conform to the seed. *Embryo* straight. *Cotyledons* ovate. *Radicle* oblong, pointing to the umbilicus, or pointed end of the seed, which is next to the middle of the axis of the fruit.

The fruit is too sour to be eaten raw, but makes very good tarts. The tree is of a middle size, very ornamental, and a perfect evergreen in Bengal.



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2. F. *Ramontchi. Willd.* iv. 829. *L'Herit. Stirp.* 59. *t.* 30.

Shrubby, armed. *Leaves* oval, crenate. *Racemes* terminal.

A native of Madagascar, from the Isle of France it was brought to the Botanic garden, where it grows but very slowly, and has not yet flowered. Grafted on the other species, natives of India, they take readily but very slowly.

3. F. *cataphracta. Willd.* iv. 830.

Arboreous, thorns terribly decompound on the trunk; *branchlets* unarmed. *Leaves* ovate, oblong, serrulate. *Racemes* axillary, few-flowered.

*Beng.* Paniyala.

This species I found in the Company's Botanic garden, where it grows to be a pretty large tree; it was introduced about three years ago from the eastern frontier.

*Trunk* short, armed with innumerable, large, very ramous thorns. *Bark* brown, pretty smooth. *Branches* numerous, generally unarmed, except the lower parts of the largest next the trunk, and straight shoots, of which there are often many on them, while young they are cross-armed and simple. *Leaves* alternate, short-petioled, oblong, serrate, smooth, shining green on both sides, from two to three inches long. *Stipules* none. *Racemes* small, from five to ten-flowered, axillary, or from the germs of the old axills over the naked branchlets. *Bractes*, a small, cordate one below each pedicel. MALE. *Calyx* from four to five-parted, small. *Corol* none. *Filaments* numerous, as long as the calyx, inserted into a nectarial-looking, glandular, convex receptacle. *Anthers* small. FEMALE FLOWERS on a distinct tree. *Calyx* from four to six-leaved, or split to the base; *leaflets* spreading. *Corol* none. *Nectary* a glandular, lobate ring girding the base of the germ. *Germ* superior, round. *Style* short and thick. *Stigma* large, from four to six-parted, stellate. *Berry* of the size of a common plum, globular, smooth, purple, succulent, from eight to twelve-seeded, ten is the

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natural number when all come to maturity. The *berries* are palatable and reckoned wholesome.

4. T. *sepiaria. Willd.* iv. 831. *R. Corom. pl.* 1. *N.* 68.

Shrubby. *Thorns* simple, leaf and flower-bearing. *Leaves* oblong, obtuse, serrate, smooth. *Peduncles* axillary, and terminal. *Berries* about five-seeded.

Sideroxylon *spinosum. Willd.* i. 1091.

*Teling.* Kanroo.

Courou-moelli. *Rheed. Mal.* v. *t.* 39.

A small shrub, common on uncultivated land, in various parts of India.

5. T. *sapida. Willd.* iv. 830. *R. Corom. pl.* 1. *N.* 69.

Arboreous. *Thorns* axillary, simple. *Leaves* oval, serrate, smooth. *Peduncles* axillary, few-flowered. *Berries* from eight to ten-seeded.

*Sans.* Swadoo-Kuntuka.

*Beng.* Bincha.

*Teling.* Pedda-Kanroo.

A native of Coromandel and Bengal, though by no means so common as *sepiaria.*

6. F. *obcordata. R.*

Shrubby, armed. *Leaves* obcordate, crenate. *Flowers* terminal. *Berries* ten-seeded.

A native of Chittagong.

## *CHAULMOOGRA. R.*

MALE. *Calyx* from four to five-lobed. *Corol* five-petalled, with a nectarial scale under the base of each. FEMALE. *Calyx* and *corôl* as in the male. *Germ* superior, one-celled; *ovæ* numerous on five parietal receptacles. *Styles* five, *Berry* dry, one-celled, many-seeded. *Embryo* furnished with a perisperm; direction of the radicle various.



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*C. odorata. R.*

Chaulmoogra and Petarkura, are the names of this tree, and the drug, hereafter mentioned, which it furnishes. It is indigenous in the Silhet district, and grows to a large size, equalling the largest Mango trees, and when full grown may be compared to the great Maple, or Sycamore, *Acer Pseudo-platanus.* It blossoms in April and May, and the seed ripens about the close of the year; when the fruit is gathered, the seed is carefully taken out, dried, and sold to the native dealers in drugs at about five Rupees the maund of eighty-four pounds.

*Trunk* and *large branches* covered with tolerably smooth, ash-coloured bark; the young shoots more or less declinate, round, smooth and green. Wood of a light brown colour, close-grained, and seemingly fit for a variety of purposes. *Leaves* short-petioled, alternate, bifarious, drooping, lanceolate, entire, acuminate, smooth, from six to ten inches long, and from one and a half to two and a half broad. *Stipules* none. *Peduncles* from the sides of the ligneous branchlets of from one to several years' growth, generally several together, from one to two inches long, one-flowered. *Bractes* minute round the base of the peduncles. MALE FLOWERS an inch and a half in diameter, when expanded of a pale yellow, and powerfully fragrant. *Calyx* one-leaved, bowl-shaped; *border* from four to five-lobed. *Petals* five, sessile, oblong, inserted into the receptacle, round the filaments. *Nectary*, five ciliate, oblong scales, or smaller petals of a deeper yellow colour over the lower half of the proper petal, and attached to them. *Filaments* about a hundred, woody, inserted into the disk of the receptacle. *Anthers* linear, erect, about the length of the filaments, two together, rather shorter than the petals. *Germ* none. FEMALE on a distinct tree. *Peduncles* in bundles from tuberosities over the trunk, and larger branches, one-flowered as in the male. *Flowers* larger than the male ones, and fragrant. *Stamina* none, but round the base of the germ are inserted about ten pinnatifid,

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villous bodies. *Germ* superior, round, slightly five-lobed, one-celled, containing numerous ovula attached to five parietal receptacles, as in Jussieu's *Capparides*, to which this will no doubt belong. *Styles* five, shorter; *stigmas* large, sagittate-cordate. *Berry* globular, of the size of a shaddock, one-celled. *Cortex* thick, rough, ash-coloured on the surface, internally brown, and composed of rays pointing to the centre of the berry. *Receptacle* in the ripe state uncertain. *Seeds* numerous, of the size of large filberts, immersed in pulp, various in shape, but in general nearly oval, smooth, light gray. *Integuments* two; the *interior* one membranaceous. *Perisperm* conform to the seed, fleshy, of a whitish gray. *Embryo* white. *Cotyledons* sub-reniform. *Radicle* oval, direction various.

The seeds of this tree, called Chaulmoogree, or Petarkura by the natives, are employed by them in the cure of cutaneous disorders. When freed from the integuments, they are beat up with clarified butter, into a soft mass, and in this state applied thrice a day to the parts affected.

### *TREWIA. Linn.*

MALE. *Calyx* from three to four-leaved. *Corol* none. *Stamina* numerous. FEMALE. *Calyx* beneath, from three to four-toothed. *Corol* none. *Style* four-cleft. *Drupe* four-celled, with a single, one-seeded nut in each. *Embryo* inverse, and amply furnished with a perisperm.

T. *nudiflora. Willd.* iv. 834.

*Leaves* opposite, cordate. *Flowers* axillary; the *male* ones on a pendulous raceme, the *female* ones solitary.

Tetragastris *ossea. Gært. Fruct.* ii. 130. *t.* 109. *f.* 5.

Canschi. *Rheed. Mal.* i. *t.* 42.

Rottlera *indica. Willd. Gœtt. Diar. Hist. Nat.* i. *p.* 8. *t.* 3.

*Beng.* Pitali.

A native of various parts of India; in Bengal it is common

on the banks of the Ganges, where it grows to be a large tree; but the wood is soft, and of little or no value. Flowering time the hot season.

## DIOECIA MONADELPHIA.

*JUNIPERUS. Schreb. gen. N.* 1552.

MALE. *Calyx* of the ament, a scale. *Stamens* three. FEMALE. *Calyx* three-parted. *Petals* three. *Styles* three. *Berry* three-seeded, irregular, with the three tubercles of the calyx. *Embryo* inverse, and furnished with a perisperm.

1. J. *elata. R.*

Arboreous. *Leaves* crowded, without order, erecto-patent, sub-cylindric, mucronate.

A large timber tree, a native of the Island of Pulo Pinang, and of a very slow growth; at least in the Botanic garden, where the oldest plants are not less than fifteen years old, and not more than seven feet high.

2. J. *aquatica. R.*

Shrubby. *Leaves* single, distichous, linear, not mucronate.

*Chin.* Then-tsong.

Common on the little uncultivated slips of land which separate rice lands in the vicinity of Canton in China; and from thence introduced into the Botanic garden by Mr. W. Kerr.

3. J. *chinensis. Willd.* iv. 851.

Shrubby, very ramous and spreading much. *Leaves* tern, crowded, sub-imbricated, mucronate.

From China this elegant, low, spreading, glaucous shrub, has been introduced into the Botanic garden at Calcutta.

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4. J. *communis. Willd.* iv. 853.

Shrubby. *Leaves* tern, patent, very sharp pointed.

*Chin.* Tien-tsong.

A very beautiful, densely ramous shrub, with a short distinct trunk, covered with dark brown bark which now and then peels off in little flakes; some few of the little twigs bear opposite, imbricated, small, obtuse leaves as in *barbadensis*; but I have not yet observed any tendency to the complanate form, in this pretty glaucous species.

5. J. *cernua. R.*

Shrubby, branches rather thin, with their extremities drooping elegantly. *Leaves* tern, spreading, mucronate.

*Chin.* Ying-loe.

A most elegant, thinly branched, small shrub, with a very distinct trunk, covered with smooth, dark brown bark; the exterior coat whereof peels off from time to time; branchlets drooping like the Weeping Willow; these leaves are rather larger, more remote and of a purer green than in the other species from China.

6. J. *dimorpha. R.*

Shrubby. *Leaves* tern, spreading mucronate, some few are also opposite and imbricated in rows, they are minute and obtuse.

*Chin.* Kong-nam-tsong.

A beautiful, very ramous shrub, with a distinct, short trunk, covered with dark brown bark; some few of the little branchlets having a tendency to the flat, or complanate form, and those have short, oval, obtuse, opposite, appressed leaves, as in J. *barbadensis.* MALE. *Calyx* none. *Corol* none. *Stamina* many. *Anthers* peltate, eight-cleft, in our China species two-lobed. FEMALE. *Corol* none. *Style* none. *Seed* one in a berried calycle which is quite entire.

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7. J. *chinensis. R.*

*Leaves* scattered, approximate, linear-lanceolar, rather obtuse. *Male aments* cylindric. *Anthers* two-lobed.

A native of China, in the Botanic garden the male plant flowers in February.

*CISSAMPELOS. Schreb. gen. N.* 1555.

MALE. *Calyx* from four to six-leaved. *Corol* none, or three-petalled. *Anthers* on the margin of the peltate apex of single filaments. FEMALE. *Calyx* and *corol* various. *Germ* superior, one-celled, one-seeded; *attachment* lateral. *Berries* oblique, containing one rugose, doubled seed. *Embryo* inverse, uncinate, and furnished with a perisperm.

1. C. *glabra. R.*

Perennial, twining, every part smooth. *Leaves* round cordate, peltate, scarcely repand; *umbels* axillary, compound; *male umbellets* cymose.

Peer-gruj is the vernacular name in Silhet, where it is indigenous, and the root, which is very acrid, is used in medicine by the natives. Flowering time the month of May, and the seed ripens in November.

*Root* tuberous, perennial, of various shapes like other irregular tubers, but tending most to the roundish form, and often as large as a man's head, smooth and whitish. *Stems* and *branches* twining to an extent of some fathoms, while young smooth, of a glossy green; when old the bark is ash-coloured. *Leaves* long-petioled, profoundly peltate, roundish or reniform-cordate, smooth, with the *margins* often slightly repand, and the length and breadth nearly equal, viz. from two to six inches. *Petioles* longer than the leaves, round and smooth. MALE. *Umbels* axillary, solitary, or in pairs, compound, their peduncles rather shorter than the petioles. *Umbellets* single, long-pedicelled, cymose, and in this it differs widely from those of C. *hexandra*, where they are globular

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heads. *Involucres* subulate. *Calyx* six-leaved; *leaflets* obovate. *Petals* three, obovate. *Filaments* single, columnar, with a peltate apex, round the margin of which is the polleniferous groove. FEMALE FLOWERS on a different plant. *Umbels* axillary, solitary, much smaller and shorter-peduncled than in the male, compound; *umbellets* from six to ten, minute, six or twelve-flowered. *Involucres* and *involucrets* small, subulate, one to each division. *Calyx* of one small, oval leaflet, pale yellow. *Corol* two-petalled; *petals* opposite, roundish, concave, longer than the calyx, of a deep orange yellow. *Germ* superior, long-ovate, one-celled, containing a single ovulum, attached to the gibbous side of the cell. *Style* short. *Stigma* from four to five-cleft. *Berry* obovate, of the size of a pea, having the remains of the style remaining near the base, succulent, smooth, red, one-celled. *Seed* solitary, doubled like a horse shoe, with the convexity up, and so exactly like *Gærtner's* Wal-tiedde. *vol.* ii. *p.* 488. *t.* 180. *f.* 12. that it may well be referred to this. *Integuments* two, the exterior one subnuciform, two-valved. *Perisperm* conform to the seed. *Embryo* nearly the length of the perisperm, inverse, linear, uncinate. *Radicle* with the apex under the stigma.

2. C. *hexandra. R.*

Shrubby, twining. *Leaves* peltate, cordate, entire, nine-nerved. *Umbels* compound. *Male umbellets* globular heads of flowers, with a six-leaved calyx, and three-petalled corol; in the female the calyx is three-leaved, and the corol three-petalled.

*Beng.* Neemooka.

Pada-valli, or Pada kelangu, *Rheed. Mal.* vii. *t.* 49. is like the female plant.

Stephania *rotunda. Lourier. Cochinch.* 747.

Menispermum *peltatum. Willd.* iv. 827.

A native of Bengal. Flowering time the beginning of the rains.



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3. C. *convolvulacea. Willd.* iv. 863.

Perennial, twining. *Leaves* sub-peltate, from ovate-cordate to reniform. *Male flowers* panicled; *female* racemed, with reniform, many-flowered bractes. *Calyx* and *corol* of one obovate, ciliate scale each.

*Teling.* Pata.

Menispermum *orbiculatum. Willd.* iv. *p.* 828.

Cattu-valli, or Battu-valli. *Rheed. Mal.* xi. *p.* 127. *t.* 62.

A native of Coromandel, Malabar, &c.

4. C. *Caapeba. Willd.* iv. 863.

Perennial, twining, tender shoots very woolly. *Leaves* broad-cordate, scarcely peltate, woolly. *Female flowers* racemed, with sessile, cordate acuminate, many-flowered bractes; a one-leaved, oblong, acute calyx, and obcordate corol.

A native of of the Moluccas. It flowers during the hot season in the Botanic garden.

5. C. *hernandifolia. Willd.* iv. 861.

Perennial, twining, villous. *Leaves* profoundly peltate, cordate, apex mucronate, base truncate, hairy underneath.

An extensively twining perennial, a native of Chittagong, from thence it has been about two years introduced into the Botanic garden but has not yet blossomed, which must account for the imperfection of the definition.

6. C. *tetrandra. R.*

Shrubby, twining. *Leaves* peltate, reniform-cordate, entire. *Male inflorescence* axillary, compound. *Flowers* tretrandrous. *Calyx* four-leaved. *Nectary* cup-shaped, filled with stamina.

A native of Amboyna.

*MYRISTICA. Schreb. gen. N.* 1562.

MALE. *Calyx* trifid. *Corol* none. *Filament* single, columnar; *anthers* several pairs round the enlarged apex of the

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filaments. FEMALE. *Calyx* as in the male. *Corol* none. *Germ* superior, one-celled, one-seeded; *attachment* inferior. *Drupe* superior, fleshy, two-valved, nut one-seeded, covered with a multifid aril, commonly called mace. *Embryo* inferior, and furnished with an ample ruminated perisperm.

M. *moschata. Willd.* iv. 869.

*Leaves* oblong. *Male flowers* several on simple and compound axillary racemes. *Female flowers* solitary. *Calyxes* pitcher-shaped.

M. *officinalis. Linn. Syst.* 493. *Suppl.* 265. *Gært.* i. *t.* 41.

M. *Moschata. Woodville's Medical Botany*, 363. *t.* 134.

Nux myristica. *Rumph. Amb.* ii. 14. *t.* 4.

Jay-phal*u*, the Sanscrit name of the *nutmeg*, and Jati the *mace.*

Jaga-phul, the Bengalee name of the *nutmeg*, and Jatri the *mace.*

Jouz-bewa of the Persians.

A native of the Moluccas, and other Islands in their vicinity, bearing *male* and *female* on different trees; and there blossoming and bearing fruit the whole year. In some instances I have observed them to be monoicous.

*Trunk* straight up to the top of the tree, as in the pines. *Bark* smooth, and of a greenish ash, or dirty olive colour. *Branches* in regular equi-distant verticels, nearly horizontal, with their extremities often drooping. *Leaves* alternate, sub-bifarious, short-petioled, oblong, entire, smooth on both sides, but paler underneath, when bruised faintly aromatic; from three to six inches long, and from one to two and a half broad. MALE. *Racemes* axillary, often two-cleft near the apex, with the divisions spreading. *Flowers* numerous on ascending, clavate pedicels, nearly as long as the peduncles, small, inodorous, and yellow. *Bractes* of the pedicels solitary, minute, one-flowered, caducous, those of the four lower ones also solitary, but larger, fleshy, more permanent, and embracing two thirds of the base of the calyx. *Calyx* pitcher-shaped, mouth three-toothed. *Corol* none. *Filament* single, resting



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in the centre of the calyx and nearly of the same length, thick, linear-oblong, and obtuse. *Anthers* in general about nine pairs, linear, adjoined lengthways to the upper half of the filaments, but their chief bond of connexion appears to be at their lower extremities. FEMALE. *Peduncles* axillary, solitary, rather longer then the petioles, while in blossom ascending one-flowered. *Bractes*, that of the flowers as in the male. *Flowers* small, yellow, inodorous. *Calyx* as in the male. *Corol* none. *Germ* ovate, one-celled, containing a single seed, attached to the bottom of the cell. *Style* scarcely any. *Stigma* two-lobed. *Drupe* superior, somewhat turbinate, smooth, of the size of a small pullet's egg; when ripe yellow, and then dividing into two equal portions, beginning at the apex, one-celled. *Nut* oval, ovate, or nearly round, marked with broad superficial furrows corresponding with the divisions of the deep orange coloured aril, or mace, otherwise smooth; colour a dark brownish black, very hard, and as the shell is of equal thickness every where, these impressions are equally evident on the inside, and are communicated to the seed, or *nutmeg*, itself, attached by a large umbilicus to the bottom of the cell. *Seed* conform to the nut, and covered with a single, light brown, thin, spongy integument. *Perisperm* conform to the seed, while fresh rather soft, juicy, and somewhat farinaceous, variously variegated, (*ruminatum*, *Gært.*) with rust coloured veins, while fresh more fragrant than after being dried. *Embryo* erect, patelliform, lodged in the base of the perisperm, white, and of a firm fleshy consistence. *Cotyledons* two, thick, fan-shaped, and expanding from the middle upwards; margins irregularly cut, or crenulate. *Plumula* of two unequal lobes. *Radicle* inferior, hemispherical.

It is well known that the description of this plant in the *Supplementum Plantarum* of the younger Linnæus, taken from Sonnerat is that of another species.

Lamarck's description, so far at least, as relates to the stamens and style, appear to me to have been taken from the

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flowers of some other species of *Myristica* which he received from the Isle of France, for the true nutmeg. Consequently the sort they have been long cultivating there, with so much care, is not the real *Banda* nutmeg, which the Dutch so long and so effectually monopolized. For I can scarcely think it possible that any Botanist could consider the thick, firmly consolidated filament of the male flowers, to be composed of from six to twelve smaller, partible filaments, joined in one bundle, for there is not the smallest rudiment of any smaller filaments connecting the linear anthers to the column, or filament, in the centre; nor are the anthers themselves united, scarcely even the two lobes which compose the pairs, as I have called them.

The foregoing description, and accompanying drawing, are taken from many, healthy growing trees in the Honourable Company's Botanic garden as well as from numerous specimens, preserved in spirits, and otherwise collected, and sent from Great Banda Neyra, Pulo-ay, and the Molucca Islands, while they were in the possession of the English from 1796 till 1802. At Bencoolen, where this tree was introduced in 1798, they have grown with the greatest luxuriance; for in five years they had arrived at from ten to fourteen feet in height. In October and November 1802, two hundred and forty-seven trees out of about six hundred, blossomed. About half of these were male, the rest female, and ripened their fruit in February and March 1803. In the Botanic garden at Calcutta, where the young trees are about the same age, the most luxuriant ones are from six to ten feet high, and in April 1803 three male trees only blossomed for the first time. At Prince of Wales' Island, where by far the most extensive plantations are formed, they are in a middle state between Bencoolen and Bengal, but do not by any means thrive so well as in Sumatra, where they are perfectly at home, in every respect, and earlier than in the Molucca Islands.

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*Note.* The plantations in the vicinity of Bencoolen have continued to thrive and multiply astonishingly till the present time, 1809. The trees now amount to about six thousand six hundred, are abundantly productive, and both nuts and mace are uncommonly fine.

2. M. *macrophylla. R*

*Leaves* short-petioled, cuneate-oblong, clothed with fine down underneath, with veins parallel and simple. *Female flowers* in lateral and axillary fascicles in very short diverging peduncles. *Germ* hairy.

Nux myristica mas. *Rumph. Amb.* ii. *t.* 5.

The female specimens in flower have only been seen; and they are easily distinguished from the other species, by the great size of the leaves, and the fascicles of sub-sessile female flowers, with hairy germs. This cannot well be referred to Willdenow's M. *tomentosa*, on account of the shape of the leaves.

3. M. *montana. R.*

*Leaves* ovate-lanceolate, smooth. *Flowers* axillary; *males* many, on a common, short peduncle; *females* one to three, on very short, proper peduncles only. Both *calyces* pitcher-shaped, and tridentate.

A native of the mountains of the Molucca Islands, where it grows to be a tree of considerable size, but the fruit made no use of.

4. M. *peltata. R.*

*Leaves* lanceolar, smooth, above shining. *Male flowers* axillary, fascicled, rotate, staminiferous, column peltate, with about twelve anthers round the under side of the margin.

A native of the Moluccas. The male flowers during the hot season in the Botanic garden at Calcutta.

5. M. *salicifolia. Willd.* iv. 871.

*Leaves* lanceolate, villous underneath. *Peduncles* axil-

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lary, from two to three-flowered. *Aril,* or mace, fleshy, and undivided; *nut* oblong.

Palala secunda. *Rumph. Amb.* ii. *p.* 26. *t.* 6.

A native of the Malay islands.

6. M. *spicata. R.*

*Leaves* short-petioled, broad-lanceolate, smooth and firm. *Female flowers* numerous, on short, solitary, axillary spikes. *Calyces* pitcher-shaped.

A native of the Moluccas. Introduced into the Botanic garden in 1798, and in 1804 one female tree blossomed during the rains, when it was about twelve feet high. All the flowers proved abortive; no part of the tree possesses any fragrance.

7. M. *angustifolia. R.*

*Leaves* narrow-lanceolate, acute, smooth, entire, glaucous underneath. *Male umbellets* axillary, sub-sessile.

A very large tree, a native of the mountainous countries immediately east of Bengal, where it blossoms about the beginning of the rains in June.

8. M. *parviflora. R.*

*Leaves* short-petioled, ovate-oblong, smooth. *Female racemes* axillary, of the length of the petioles.

A native of the Molucca islands. One female tree in the Botanic garden, in twelve years attained the height of about fifteen feet, with a straight trunk of proportional thickness. It blossoms regularly during the rains, but the flowers have hitherto proved abortive.

9. M. *linifolia. R.*

*Leaves* linear, smooth, and hard; *petioles* and other tender parts densely clothed with brown ramentaceous scales. *Male flowers* in axillary fascicles; *anthers* from fifteen to twenty on the margin of a triangularly peltate dish.

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A pretty large, tall, straight tree, a native of Chittagong, where it blossoms in January. The female tree not seen.

*ADELIA. Schreb. gen. N.* 1558.

MALE. *Calyx* from three to four-parted, or from three to four-leaved. *Corol* none. *Filament* ramous, branching out into many simple, or compound ramifications. FEMALE. *Calyx* five-parted. *Corol* none. *Germ* superior, three-celled; *cells* one-seeded; *attachment* superior. *Styles* three. *Capsule* tricoccous. *Embryo* inverse, with a scanty perisperm.

1. A. *castanicarpa. R.*

Arboreous. *Leaves* oblong, entire. *Stipules* falcate. *Flowers* axillary, crowded. *Calyx* four-leaved.

*Beng.* Boolkokra.

A large timber tree, a native of Silhet and Chittagong. The wood is said to be very hard. Flowering time November and December, and again in May and June. The seed ripens in May, and a second crop in the cool season.

*Young shoots* a little hairy, but the hairs soon disappear, leaving them smooth. *Leaves* alternate, bifarious, approximate, short-petioled, from ovate-oblong to broad-lanceolate, rather acuminate, entire, of a firm and smooth texture, from four to five inches long, by from one to three broad. *Stipules* falcate, pretty large. MALE FLOWERS axillary, crowded, sessile. *Calyx* four-leaved; *leaflets* in two opposite pairs, ovate, ciliate. *Corol* none. *Nectary*, a crenulate cup, round the base of the column from the middle downwards; all are smooth. *Anthers* oblong, incumbent. FEMALE FLOWERS axillary, several together, some sub-sessile, some short-peduncled, small, of a dull grayish yellow colour. *Bractes*, some roundish, hairy scales round the base of the peduncles. *Calyx* of two opposite pairs of oval leaflets. *Corol* none. *Nectary* saucer-shaped, embracing the base of the germ

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with its very finely dentate margin. *Germ* bristly, three, rarely four-celled, with one ovulum in each, attached to the top of the axis. *Styles* three, recurved and bifid with the segments, also recurved and shaggy. *Capsule* round, size of a nutmeg, completely armed with innumerable, hispid, acute, rather inoffensive light brown bristles, three-celled, six-valved; *valves* hard like the shell of most nuts. *Seed* solitary, attached to the top of the axis, and the attachment embraced by a crimson, fleshy gland, or aril; size of a grain of black pepper, but compressed. *Integuments* two; exterior thin, brittle, highly polished, black, inner a brown, thin membrane. *Perisperm* none, or most trifling. *Embryo* inverse. *Cotyledons* conform to the seed, oily. *Radicle* oval, superior.

2. A. *nereifolia. R.*

Shrubby. *Leaves* alternate, linear-lanceolate. *Spikes* axillary, solitary.

*Teling.* Taniki.

*Mal.* Katt-alluree.

A native of Coromandel, where it flowers during the hot season.

3. A. *cordifolia. R.*

*Leaves* alternate, long-petioled, round, cordate, entire. *Male spikes* axillary. *Anthers* four-valved.

A native of the Moluccas.

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*The words in italics are synonyms.*


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